

AIR pictorial

SEPTEMBER 1980

55p

*Britain's
Aerospace
Industry*



THE STRIKING TRAINER



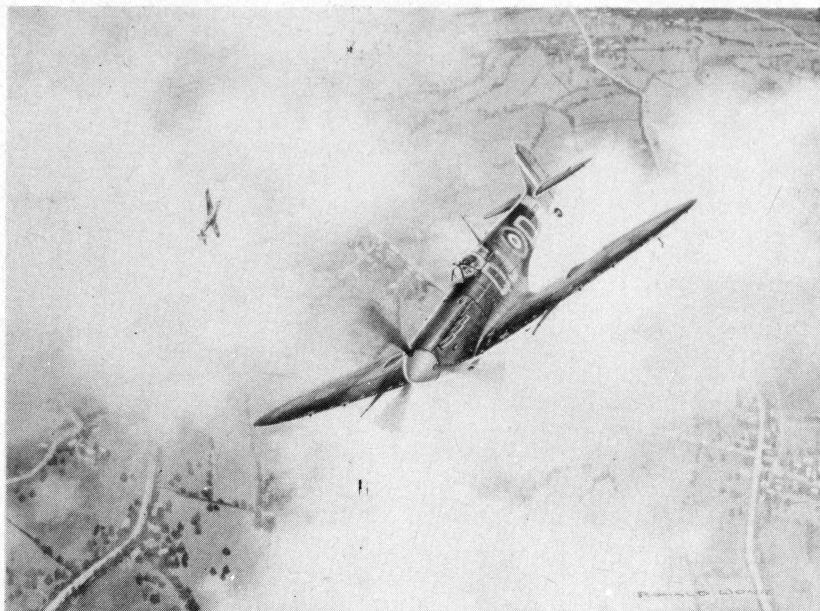
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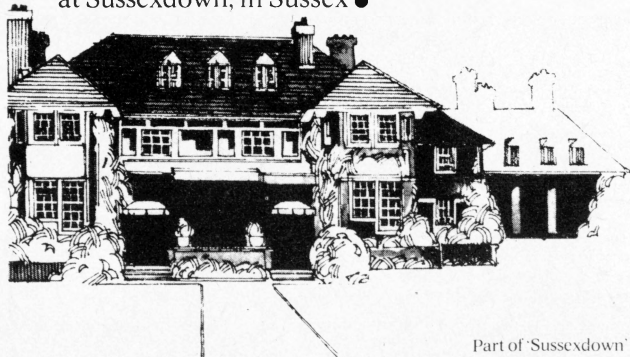


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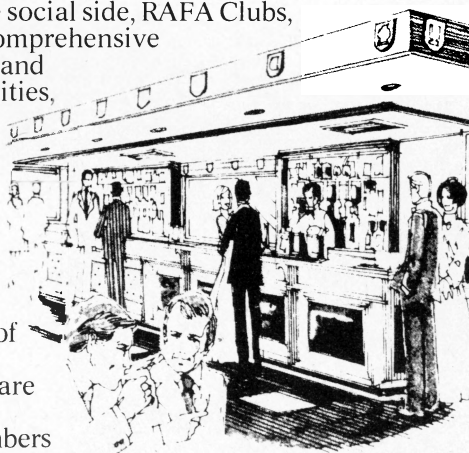
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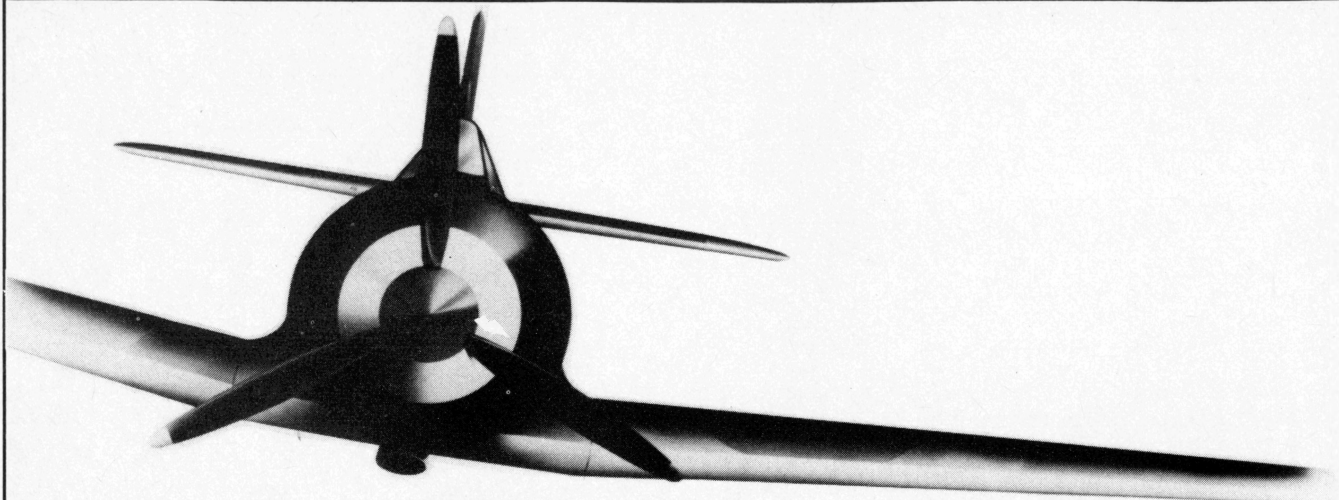


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COVER: Panavia Tornado GR.1 third prototype XX947 carrying eight 1,000-lb. bombs, two 1,500-litre long-range tanks and two ECM pods (Photo: Arthur Gibson)

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SEPTEMBER 1980

AIR pictorial

The Industry

BREATHES THERE the man with soul so dead who never (to misquote Sir Walter Scott) has felt a tingle of excitement at the start of Farnborough. With around 500 companies from eighteen countries exhibiting, this year's S.B.A.C. Show promises to be the largest aeronautical "shop window" ever staged in Britain. Britain's aerospace industry—as can be gauged from an article in this issue—is in a fairly healthy state, in contrast to many other large industries in this country. But for it to stay healthy—and preferably regain its former position in the world—much effort and imaginative foresight will be needed.

British aerospace exports continue to rise in financial terms at least. For the first five months of 1980 they totalled £645,168,000—or £135,092,000 up on the same period in 1979 (but one must not forget the effect of inflation). A breakdown of the £645,168,000 shows: aircraft and associated equipment, £72,758,000; aircraft parts, £246,068,000; engines and parts, £272,202,000 (parts again accounting for the greater proportion); instruments, £31,890,000; the rest being due to guided weapons, tyres, parachutes, radio/radar, catapults, etc.

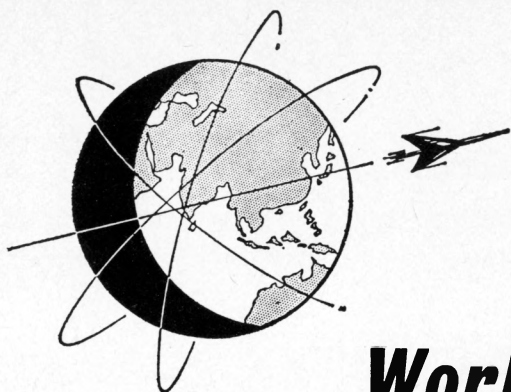
It will be seen that complete aircraft represent a relatively small proportion by value of the total. One might now consider how many aircraft Britain builds a year, for both the home and export markets. Our estimate, excluding homebuilts, gliders and balloons, is about 280—certainly under 300. Obviously there are fluctuations—1979 was a good year for HS 125s (55 delivered), Islanders (42) and the Lynx (53), for example. It would appear that Westland are producing helicopters at the rate of 80–90 a year and Pilatus Britten-Norman (Swiss-owned and with some production in Romania) are turning out Islanders/Trislanders/Defenders at 50–60 a year. Hawk production probably runs at 30–40 a year, but otherwise the output of military aircraft seems very small. However, this year production of the Tornado should begin to get into its stride—and none too soon if one thinks of all the over-age types it has to replace.

Two comparisons might be of interest. Boeing, noting a slow-down in airliner orders, have stated that they may cut their present production rate of 28 not-inconsiderable aircraft a month to about 25 in 1981. Russia, according to a former Chief of the Air Staff, is building military aircraft at a rate equivalent to re-equipping the R.A.F.'s front-line every six months. The present C.A.S. must surely be wondering what our industry could do to speed up production in an emergency.

Throughout its history the British aircraft industry—until recently consisting mainly of privately owned firms—has shown great skill in answering calls for a rapid increase in production; one remembers the vast amount of sub-contracting, the "shadow" factories and the use of motor car firms to build aeroplanes before World War II. We reckon that the skill is still there, but there are two new problems which must be solved: immobility of labour (who can afford to move house these days?) and a shortage of young people either willing or qualified to make engineering a career.

The Government appears to be aware of these problems and we would advise that whatever measures can or may be taken to alleviate them be directed first at industries, such as aerospace, which make a profit for the country and are not a never-ending drain on the taxpayer.

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Impression of the Embraer EMB-110P3 pressurised version of the Bandeirante

World Air News

Britain's nuclear deterrent

BRITAIN'S FUTURE nuclear deterrent force will consist of four nuclear-powered submarines each armed with sixteen Lockheed Trident I ballistic missiles. Total cost of the programme, which will be spread over fifteen years, is estimated at £5,000 million and at its peak will account for about 5 per cent of the defence budget.

The new submarines, to be built in Britain, will begin to replace the Royal Navy's current fleet of four Polaris-armed boats in the early 1990s. It is hoped to find funds (about £600 million) to buy a fifth submarine so that two vessels can be kept on station at all times; a decision on this is expected during the next two or three years. The Trident fleet will be committed to NATO but will remain under British control.

Compared with the current Polaris A-3 missile, which has a range of 2,500 nautical miles, the Trident I has a range of 4,000 n.m. and is expected to remain effective for 30-40 years. Britain will buy up to 100 Tridents from the U.S.A., each fitted with eight manoeuvrable re-entry vehicles, at a cost, including associated equipment, of about £1,000 million. The warheads will be made in Britain.

Cruise missiles were considered as an alternative successor to Polaris but

it is felt that they might not be able to penetrate Soviet air defences by the turn of the century. Furthermore, the 4,000 n.m. range of the Trident will allow the submarines to operate in a much larger area and they will be able to target Russian cities from, say, the north-west Atlantic or Indian Ocean.

Meanwhile, it has been announced that the 160 cruise missiles which the U.S.A. is to station in Britain will be based at R.A.F. Greenham Common, Berks., and R.A.F. Molesworth, a disused airfield in Cambridgeshire. Greenham will be the major base with six Flights of sixteen missiles each and Molesworth will house four Flights. The first cruise missiles will be deployed at Greenham towards the end of 1983.

Douglas DC-XX

On 28th July the McDonnell Douglas Board approved continuation of advanced engineering and technical verification work on the ATMR (Advanced-Technology Medium-Range) airliner, now designated the DC-XX, so that if circumstances warrant the project can be launched rapidly. At the same time the company is continuing discussions with other manufacturers who might wish to participate in the programme.

Powered by two Pratt & Whitney JT10D-132s, the DC-XX is designed to

carry 180 passengers seated six-abreast in a twin-aisle mixed-class layout. The manufacturers claim that on 500-n.m. sectors with full passenger and baggage load, the DC-XX would use 36 per cent less fuel than the Boeing 727-200 and 24 per cent less than a CF6-powered Boeing 757. The world market for airliners in the DC-XX category is estimated at 2,100.

Pressurised Bandeirante

Embraer of Brazil are developing a new 19-passenger pressurised version of their Bandeirante, the EMB-110P3, which is scheduled to fly early in 1982 with first deliveries to customers a year later.

Powered by two 1,173-s.h.p. Pratt & Whitney PT6A-65 turboprops, the EMB-110P3 will have a maximum take-off weight of 7,000 kg. and a range of more than 600 nautical miles. The aircraft will have a T-tail and double wheels on all undercarriage legs.

Boeing sales

Eastern Air Lines of Miami have ordered four more Boeing 757s, increasing their total to twenty-seven. Powered by Rolls-Royce RB.211-535C engines, the new twinjets are scheduled for delivery in late 1984. Eastern have options on a further twenty-four 757s.

The new order replaces a previous contract which Eastern had for four 727s. Sales of the 757 now total fifty-two and there are options on a further forty-two. The 757 is expected to fly in February 1982 and enter service in early 1983.

Tunis Air have ordered two Boeing 737-200s for delivery in April and June 1981.

Buccaneers flying again

On 28th July the Defence Minister, Mr. Francis Pym, announced that "R.A.F. Buccaneers will be resuming normal flying immediately". Following the crash in Nevada on 7th February, when cracks due to metal fatigue were found in the aircraft's front spar, all R.A.F. Buccaneers were suspended from peacetime non-operational flying.

It has now been established that the Nevada accident was caused by the failure of the aircraft's starboard wing under loadings greater than it could

Two of a batch of nine Embraer EMB-326GB Xavantes (licence-built Macchi 326s) for the Paraguayan A.F., 1002 and 1004, at São José dos Campos before delivery. The Brazilian firm has also exported six Xavantes to the Togo A.F. and delivered 152 of these aircraft to the Brazilian A.F.





Second Boeing 747-227B for Braniff International, N605BN was delivered in July and increases the airline's "Jumbo" total to five, including two 747SPs. Colour scheme is a brilliant orange with yellow trim and grey wings

withstand in its fatigued state. Since then every Buccaneer has been thoroughly inspected, two aircraft totally dismantled, flight trials undertaken to revalidate the fatigue test specimen, and a detailed repair scheme devised.

Over half the Buccaneer fleet was found to be either intact or with minor cracks which have now been repaired. The remaining aircraft, in which more substantial cracks were found, can be recovered to front-line flying and "the economics of this are now being considered".

Hitherto, said Mr. Pym, we had maintained our full Buccaneer declaration (five squadrons) to NATO, but it was now clear that this declaration would have to be reduced initially and possibly in the longer term also.

More DC-10s for Mexicana

Compania Mexicana de Aviacion have ordered two more McDonnell Douglas DC-10-15s for delivery in June 1982, increasing their total to five. Mexicana's first two DC-10s are due to be delivered in mid-1981 and will be used initially on domestic routes from Mexico City to Monterrey, Guadalajara and Merida, and also on the international service to Los Angeles.

Last year Mexicana carried 6.2 million passengers—more than any other airline in Latin America. DC-10 orders now total 360.

Skyvans for Malawi

The Government of Malawi has ordered three Shorts Skyvans for operation by the national carrier Air Malawi. Value of the contract is over £2 million. Last December a Skyvan was ordered for the Malawi Police Force.

The Air Malawi Skyvans, which will have a restyled cabin interior, will operate scheduled services on domestic routes and will also be available for use

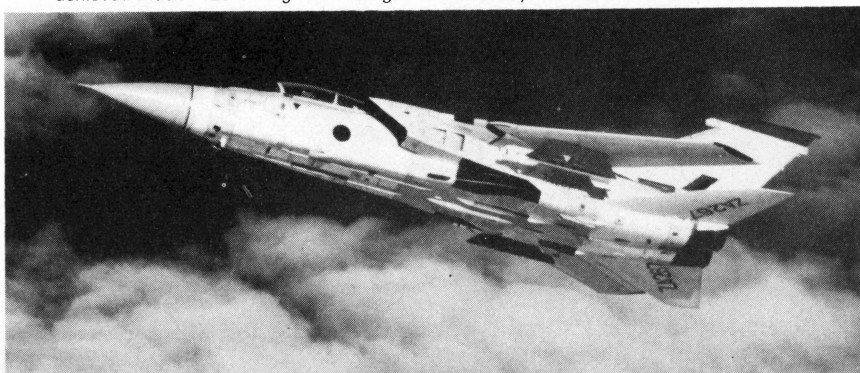


The McDonnell Douglas KC-10A Extender, 79-0433, making its first flight at Long Beach on 12th July. The U.S.A.F. has placed an initial order for six



Above: The British Aerospace Nimrod AEW.3, XZ286, taking off from Woodford on its maiden flight on 16th July. It is expected to make its debut at Farnborough

Below: The second of three Panavia Tornado F.2 air-defence variant prototypes, ZA267, achieved Mach 1.25 during its first flight on 18th July from BAe Warton





As reported last month, page 288, the 136th and last commercial Sikorsky S-61N, N15456, was delivered on 19th June to Siller Bros. of Yuba City, California

World Air News . . .

in government-initiated "self-help" projects in remote areas. Skyvan sales and options now total 136.

F.27 Maritimes for Philippines

The Philippine Government has ordered three Fokker F.27 Maritime Friendships for operation by the Philippine Air Force on coastal surveillance, fishery protection, and search and rescue duties. Deliveries will start early next year. Sales of the Friendship now total 711.

HS 125 for Argentina

Yacimientos Petroliferos Fiscales Sociedad del Estado (YPF), the Argentine state-owned oil company, have ordered an HS 125 Series 700B from British Aerospace. Together with another recent (undisclosed) sale, it brings orders for the HS 125 up to 496, of which 138 are for the latest fan-powered Series 700 version.

First F-15 for Japan

The first of 100 McDonnell Douglas F-15J Eagle fighters for the Japanese A.S.D.F. was handed over at St. Louis on 15th July. Eight aircraft (two single-seat F-15Js and six two-seat TF-15J trainers) are being supplied by McDonnell Douglas, who will also provide components for another eight to

be assembled in Japan by Mitsubishi. After that, the remaining eighty-four Eagles will be built under licence by Mitsubishi.

In J.A.S.D.F. service the Eagles will replace Lockheed F-104J Starfighter interceptors and an order for a further twenty-three F-15Js is already being considered. Mitsubishi are at present producing McDonnell Douglas F-4EJ Phantoms under licence and will deliver the 140th and last aircraft next spring.

No. 2 T.W.U. at Chivenor

R.A.F. Chivenor, Devon, was reactivated as a full flying station on 1st August, on which day six Hawks of No. 63 Squadron arrived (from Brawdy) to form the nucleus of No. 2 Tactical Weapons Unit. The first course begins this month (September) and with the arrival early next year of No. 234 Squadron, there will be some fifty Hawks at Chivenor, used by three overlapping courses.

Since 1974 the only operational R.A.F. unit at Chivenor has been "A" Flight of No. 22 Squadron with SAR Whirlwinds.

Franco-Italian 50-seater

Aérospatiale of France and Aeritalia of Italy have signed a preliminary agreement to collaborate on the development of a 44/50-seat regional transport based on their AS.35 and AIT-230 pro-

jects. Entry to service in 1985 is envisaged.

Both earlier designs were high-wing twin-turboprops, the Aérospatiale AS.35 being powered by 2,000-s.h.p. Turbomeca Makilas and seating 40 passengers, while the Aeritalia AIT-230 with Pratt & Whitney PT6A-65s was intended to seat 30.

Islanders for Mexico

The Mexican Government has ordered fifteen Pilatus Britten-Norman BN-2A Islanders and placed options on a further twenty-one. It is understood that the aircraft will be used to improve communications in remote areas and that the contract represents the largest single order for the Islander placed so far. All fifteen Islanders are to be delivered before the end of this year.

Turbine Islander

The Pilatus Britten-Norman BN-2T Turbine Islander made its first flight at Bembridge on 2nd August. Powered by two 320-s.h.p. Allison 250-B17C turboprops, it offers increased payload and greatly improved altitude performance. The prototype is expected to appear at Farnborough and deliveries to customers will start early next year.

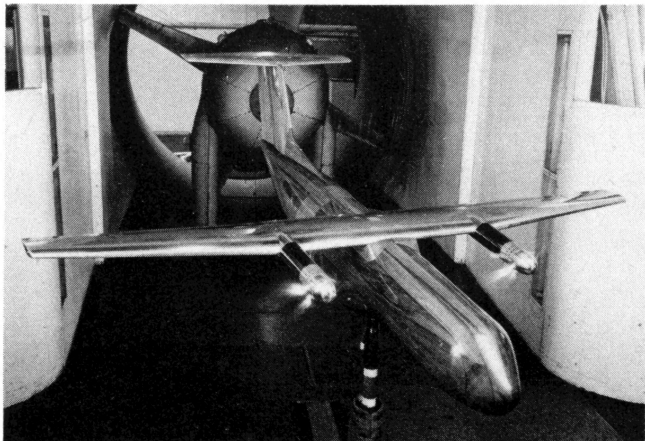
Japanese aircraft production

During the financial year ending 31st March 1980 Japan's aircraft industry produced a total of 143 aircraft, of which 72 were delivered to the Japanese Armed Forces, 7 went to domestic civil operators and 64 were exported. The total included 32 jet-powered aircraft, 60 turboprops, 26 piston-engined machines and 25 helicopters.

HS 748 for Air Illinois

Air Illinois have ordered another British Aerospace HS 748, increasing their total to two, and placed options on three more. The new aircraft will be delivered in December this year. Sales of the HS 748 now total 350.

Left: Wind-tunnel model of the Aérospatiale AS.35 which with the Aeritalia AIT-230 is to form the basis of a new Franco-Italian 50-seat regional transport. Right: Impression of the Skyship R40 58-tonnes-capacity cargo airship designed by Airship Industries Ltd., Isle of Man, who have received an order for four from Recoat Cargo Airlines plus options on ten more (see August issue, page 323)



NEWS IN BRIEF

The 1,000th DC-9, a Series 30, was handed over by McDonnell Douglas at Long Beach on 8th July to KLM Royal Dutch Airlines, who have named the aircraft "City of Santa Monica" (birth-place of DC airliners).

British Airways are planning to sell their older Boeing 747s and some 707s this year due to a decline in traffic.

The Gabonese A.F. has taken delivery of the first of three Embraer EMB-110P1 Bandeirantes and also has a maritime patrol EMB-111 on order.

The 700th Cessna Citation was delivered in July and next year production rate will be increased to eighteen a month.

The Japanese A.S.D.F. plans to buy twelve Lockheed C-130 Hercules to be delivered (six each year) in 1981 and 1982.

First Piper Cheyenne III eleven-seat twin-turboprop was delivered on 30th June to CORPAC/Midwest of Des Moines, Iowa.

Stansted Airport, Essex, will have a new terminal complex increasing capacity to 15 million passengers a year by 1988 if planning permission is granted.

Air New Zealand have leased a Douglas DC-8-63CF for their Auckland-Los Angeles cargo service from Flying Tiger and are converting a passenger DC-8-50 to all-cargo configuration.

General Dynamics F-16XL is a projected development of the F-16A fighter with a double-delta wing designed for higher speed (Mach 2.5 instead of M 2.0) and greater manoeuvrability.

Six Luftwaffe McDonnell Douglas F-4F Phantoms arrived at Goose Bay, Labrador, on 22nd July to start a two-month low-level training programme.

No. 23 Squadron, R.A.F., flying Phantom FGR.2s from Wattisham, have won the Dacre Trophy for the fourth time, previous occasions being in 1967, 1969 and 1975—a new record.

The U.S.A.F. deployed twelve F-4C Phantoms of the 915th TFG, a Reserve unit based at Homestead, Florida, to Bodø, Norway, during 9th–23rd August.

Pierre Satre, the noted French aircraft designer responsible for the Caravelle, died at Le Vésinet on 12th July at the age of 71.

The Argentine Army is planning to buy four Bell UH-12ETs to supplement its helicopter fleet.

Westland Whirlwind HAS.7 XG577, an ex-R.N. machine stored at Duxford, has been transferred to the Loughborough and Leicester Aircraft Museum at Castle Donington.

Sterling Airways of Denmark have sold their six Aerospatiale (Sud) Caravelle 12s to Air Inter and plan to sell their six Caravelle 10Bs.

SEPTEMBER 1980



First of five Bell 222s for Helikopter Service A/S of Oslo, Norway, recently delivered LN-OSB has been supplied in executive configuration

The Swedish A.F. has ordered three more Lockheed C-130H Hercules for delivery early in 1981. Current transport fleet includes one C-130H and two C-130Es.

British Airways have cut their Vickers Super VC10 fleet to five and the last of these will be phased out in April 1981.

The Egyptian A.F. is to receive forty General Dynamics F-16 fighters, with delivery starting in early 1982.

First Indian A.F. squadron to become operational on the Sepecat Jaguar is No. 14, using aircraft loaned by the R.A.F. until new Jaguar Internationals are supplied by British Aerospace.

The Yugoslav Government is reported to have ordered four Canadair CL-215 water-bombers for delivery in 1982.

Airbus Industrie are to acquire two more Super Guppy transports, raising their total to four, to cope with increased A300 and A310 production rates—carrying BAe-built wings from Chester to Toulouse being one of their main tasks.

The Turkish A.F. may acquire surplus Lockheed F-104G Starfighters from Belgium and Holland and Northrop F-5s from Norway as soon as these countries have sufficient General Dynamics F-16s on strength.

The U.S.A.F.'s 366th TFW at Mountain Home AFB, Idaho, is to be equipped next year with twenty-four General Dynamics EF-111s.

The Swiss A.F. has ordered two Dassault Mirage IIIB two-seat trainers to make up for attrition.

Gulf Air Transport of New Iberia, Louisiana, have acquired a Convair 440 from Nor-Fly of Oslo, Norway; the sale and delivery were arranged by USAir. Gulf's fleet now comprises four 440s and 580.

The R.A.F.'s plan to buy fourteen British Aerospace Jetstream 31s to replace Devons and Pembrokes may be postponed because of financial cuts, or even changed to fourteen cheaper Beechcraft Super King Airs.

The Swedish A.F. has ordered its final batch of 59 SAAB JA 37 Viggen fighters, bringing its total to 150 which will equip eight squadrons.

The Piper Enforcer, a modified version of the W.W.II North American P-51 Mustang, is to be evaluated again by the U.S.A.F. for light-attack duties. Funding for one Enforcer has been added to the 1981 defence budget.

"Fighting Falcon" is the official name now given to the General Dynamics F-16 fighter. It would have been simply "Falcon" if Dassault hadn't bagged that first.

The first two of five two-seat Vought TA-7H Corsair IIs for the Hellenic A.F. about to leave Dallas on 8th July on delivery to Greece



Air Affairs

A monthly commentary
by JOHN STROUD

AS I write this column thousands of people in many parts of the world will be making preparations to take part in or visit "Farnborough International 80", or what we have long regarded as the S.B.A.C. Show. The aircraft in the static park and the mass of exhibits in the near 350,000 sq. ft. of display area will, as usual, be of absorbing interest, and, we hope, considerable business will result from the discussions in the numerous chalets.

But for so many, "Farnborough's" attraction is the flying and for those, like myself, who have been present at every S.B.A.C. Show since the war, including the times when Farnborough was at Radlett—as I believe Chris Wren was the first to say—we have seen in the air aircraft representing about half of the entire history of aircraft development (Farnborough itself having seen the lot). Those who go to the shows on Public Days will have seen even more, and I must confess to having seen a near-miss involving an S.E.5 and, as far as I can remember, a Hawker Hart—an actual collision between them

would have made odd headlines for the 1960s.

I remember, back when the exhibition site was on the north side in the R.A.E. area, that Peter Brooks, my wife and I watched the flying display from the hill on which the present exhibition is staged, and we were the only people on that side of the aerodrome!

We have seen some magnificent flying at Farnborough and I have been lucky enough to take part in some of the demonstrations—including, when Farnborough was at Radlett, one in a Hastings with backward-facing seats which I can assure you are not ideal for high-speed beat-ups followed by steep climbing turns or when you have to look "up" to see cows grazing.

All this brings me to another and different form of flying display. I have, as I have said, seen all the S.B.A.C. Shows, and many Paris Shows. I have seen the "Skyblazers" from a country road in the Netherlands, far enough away to see the performance as a whole. I saw the Cobham displays and numerous others and I even organised what I believe was the first flying display in Scotland after World War II. But until this "summer" I had not seen a flying display staged over the sea. I know that many people have had the pleasure of watching the "Red Arrows" perform offshore but that has been denied me.

However, I was particularly lucky with my overwater display because of

the scenic beauty. It took place recently over the Moray Firth with the Black Isle, the entrance to Cromarty Firth and the mountains of the far north-west forming the background. The weather was perfect for the viewer, with blue sky, a few white clouds and brilliant sun, although for the pilots it appeared to be rather gusty.

The show was staged by the Rothmans Aerobatic Team and it was the first time I had seen them and the first time I had seen a Pitts biplane. I was impressed by this compact little aeroplane and its responsive controls. The way they rushed about the sky reminded me of Comper Swifts. Strangely, a few days later I got a brief three-quarter and distant rear view of a small shoulder-wing monoplane heading up the coast towards Wick. I could not identify it but the only thing that seemed to fit was a Comper Swift. I wonder whether it was; does anyone know?

Enjoyable as the Rothmans show was, it also brought a bonus in the form of a little historical knowledge. The occasion reminded the editor of our local newspaper of a much earlier display, in 1934, and he recorded that the Argosy "City of Glasgow" was present giving joyrides. I did not know that an Argosy had been so far north. I know that the "City of Glasgow" was touring with a display that year because I watched that display, held in a field near Hatfield Hyde, and had a 3/6d. joyride in the Avro 504N G-ACLV. In my log-book I see I noted it as "Short circuit", but there was nothing particularly electrifying about it. I have always wished that I had had 5/- for a ride in the Argosy.

WHAT TO SEE AT FARNBOROUGH

WELL OVER 120 aircraft are expected to appear at "Farnborough International '80", the S.B.A.C.'s exhibition and flying display which opens on 1st September (public days are the 5th, 6th and 7th). A provisional list of aircraft types is as follows:

Aermacchi MB.339A and MB.339K Veltro. Augusta A 109A. Aero Bonner Chipmunk 200. Aérospatiale AS.355E TwinStar, Tampico, Tobago, Rallye Gabier and Rallye Guerrier. Airbus Industrie A300B4-203 (for Singapore Airlines).

Beechcraft Baron, Duchess, King Air, Super King Air and Skipper. Bell 47G and 412. Boeing E-3A Sentry (Wednesday only). British Aerospace Bulldog, Hawk Mk.50, Sea Harrier, HS 125, HS 748-2B, "multi-role" HS 748, Jaguar GR.1, Jetstream 31, Nimrod AEW.3, One-Eleven (R.A.E. avionics test-bed), Strikemaster, Tornado GR.1 and F.2. BAC/Aérospatiale Concorde (final Sunday).

Canadair Challenger. Caproni C-22J. C.A.S.A. C-101 Aviojet and C-212 Aviocar. Cassutt racer. Dassault-Breguet Alpha Jet, Mirage F 1, Mirage 2000, Super Mirage 4000 and Falcon/Mystère 50. D.H. Canada Buffalo, Dash 7 and Twin Otter. Dornier 128-2, 128-6 and TNT Experimental.

Edgley Optica. Eiri Avion Pik-20E. Embraer EMB-110 Bandeirante, EMB-111 Maritime Bandeirante and EMB-121 Xingu. Enstrom F-28. Evans VP-2. Fairchild A-10A Thunderbolt II. Fokker F.27M Maritime and F.28 Fellowship.

Gates Learjet 30 Maritime and Learjet 35A. General Dynamics F-16B. Hughes 300 and 500. Lockheed C-130H Hercules and TriStar-500. Messerschmitt-Bölkow-Blohm BO 105 and MBB/Kawasaki BK-117.

McDonnell Douglas DC-9 Super 80, F-15 Eagle, F-18 Hornet, and YAV-8B Advanced Harrier. Microturbo MJ 200. Mitsubishi MU-2 Solitaire and Marquise. Nash Petrel (tourer/glider tug). NDN Firecracker.

Pezetel M-20 Mewa, Wilga 35 and SM-2. Piaggio P.166-DL3. Pilatus PC-6/B2 Turbo Porter and PC-7 Turbo Trainer. Pilatus Britten-Norman Maritime Defender, Turbo-Islander, Islander and Trislander. Piper Cheyenne I.

Repair A.G. AS.202 Bravo. Rockwell OV-10D Bronco. SAAB JA 37 Viggen. Shorts 330 and Skyvan 3M. Swearingen Merlin IIIB and Metro II. Valmet L-70 Militrainer. VFW-RFB Fantrainer.

Westland Lynx AH.1, Lynx HAS.2, WG.30, Sea King HC.4 and Commando Mk.2E.

R.A.F. in the 1980s

GUESTS AT the London Society of Air-Britain meeting on Wednesday, 10th September will be the R.A.F. Presentation Team led by G/Capt. C. E. Evans of the R.A.F. Staff College, Bracknell, who will address members on "The Royal Air Force of the Eighties". The presentation will be followed by two recent R.A.F. films.

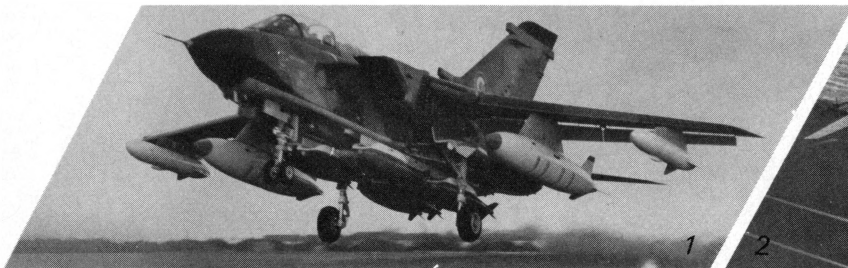
The meeting will start at 7.00 p.m. in the Lecture Theatre, Holborn Central Library, 32-38 Theobalds Road, London W.C.1. Non-members and visitors are very welcome; admission 70p.

"Dambusters" sweep the board

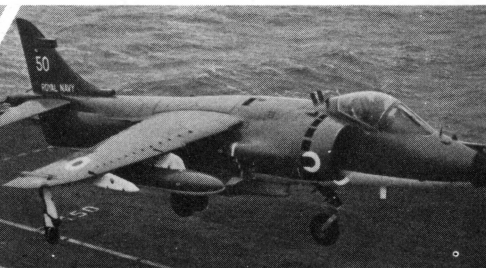
During Exercise "Double Top 80", R.A.F. Strike Command's annual bombing and navigation competition, held in July and in which eighteen R.A.F. Vulcans and four U.S.A.F. Boeing B-52s took part, No. 617 Squadron (the "Dambusters") from Scampton, Lincs., won the coveted Blue Steel Trophy and six of the seven other trophies. The General Precision Systems Trophy went to a crew of No. 50 Squadron, Waddington, Lincs.

Defence in depth

The range of military aircraft currently in production and development by British Aerospace meets every permutation of defence requirements from ab initio pilot training to airborne early warning, from low-level strike to high-altitude interception, from VSTOL capability to Mach 2-plus speeds, from tactical close support to long-range ocean patrol.



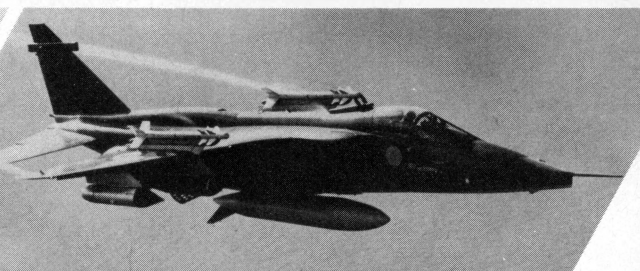
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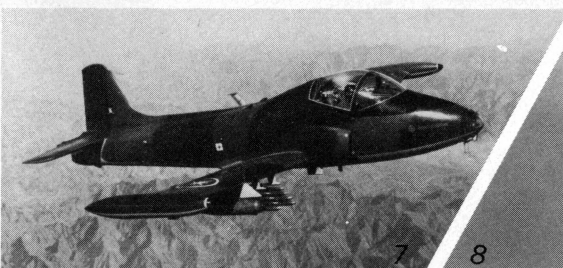
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1. **TORNADO** all-weather combat aircraft †
2. **SEA HARRIER** V/STOL combat aircraft
3. **HAWK** ground attack trainer
4. **JAGUAR** tactical strike aircraft*
5. **COASTGUARDER** maritime patrol aircraft
6. **AEW NIMROD** airborne early warning system
7. **STRIKEMASTER** ground attack/trainer
8. **BUCCANEER** strike/reconnaissance aircraft
9. **BULLDOG** primary trainer

† in partnership with MBB, Germany, and Aeritalia, Italy
* in partnership with Dassault/Breguet, France

BRITISH AEROSPACE AIRCRAFT GROUP

unequalled in its range of aerospace programmes

BAe 19

Kingston-on-Thames, England.

Hawk T.1 XX253 of the R.A.F.'s "Red Arrows" aerobatic team near its base at Kemble, Gloucs. The R.A.F. has ordered 18 more Hawks, increasing its total to 193, and a further 70 have been sold for export

ties are complementary to each other, with their ups and downs and need to be together to give a viable commercial organisation.

Despite British Aerospace's having full order books and being healthily in the black, it is unlikely that the Government will rush to float the company on the commercial money market until interest rates drop dramatically, to make investment in BAe a more attractive proposition. The Government is, of course, expected to retain a controlling interest, while reducing the amount of taxpayers' money tied up in an industry which can finance its own activities.

Short Bros. and Rolls-Royce are still Government owned, while Westland retain their commercial independence. Despite healthy order books, Britten-Norman are now part of Pilatus of Switzerland, while individual groups such as Cranfield, Edgley, the Firecracker team and the Sheriff progress slowly and quietly, driven by the individual enthusiasm of their owners.

Undoubted "flagship" of British Aerospace is still the Concorde, which owes its commercial failure largely to the unhappy fuel crisis. Technically the aircraft is a success, with its high load factors and it is popular with those passengers who can afford to save the time. If only utilisation could be raised, British Airways might find that they could make a profit. It is to be hoped that this technological lead will not be lost in a second-generation SST.

"Bread and butter"

However, British Aerospace's "bread and butter" involves more mundane tasks such as the conversion of nine ex-airline VC10s to tankers for the R.A.F.; due to enter service in 1982, they will supplement the existing two Victor tanker squadrons. Continuing at the lower end of the military market with British Aerospace is the Bulldog trainer of which more than 300 have been sold, and despite some possible small new orders, needs a rejuvenation. With the Strikemaster in a similar situation, perhaps it is not too late to take a fresh look at the basic training market and produce a compromise design in a factory where the overheads could be kept low enough to make the project viable. It may not be very long before the R.A.F. is forced to seek a Jet Provost replacement, especially as there is now a significant expansion in training requirements.

Moving up the scale, there is the Hawk, which has not only had a highly successful introduction to service with the R.A.F., but with 263 ordered has already proved to be a good seller in

Britain's Aerospace Industry

by FRANK RICHARDS

THE BRITISH aerospace industry is still the leader in Europe in its range of products, in its technology and in its quality. It leads in international co-operation, not just in Europe, but with links across the Atlantic. After two or three decades of relatively low production runs, particularly in the commercial aircraft sector, it is now beginning to show that it can help Europe become major competitors in the challenging

North American-dominated world market with good performance, economy, delivery on time and products with a proven reliability.

The industry is dominated by British Aerospace, currently in the process of being denationalised, but at least retained as a complete organisation covering the spectrum of military and commercial aircraft, defensive weapons and space equipment. All these activi-

Sea Harrier FRS.1s aboard H.M.S. "Hermes" during trials in November 1979. The Royal Navy's first operational Sea Harrier squadron, No. 800, will embark in the new anti-submarine carrier H.M.S. "Invincible" before the end of this year



the highly competitive world market. Finland, Indonesia and Kenya are all close to receiving their first aircraft, if not already in service, and the R.A.F. has increased its order for 175 by eighteen to help with the additional air-defence duties which have entailed fitting Sidewinder missiles to a large proportion of the fleet. The "Red Arrows" have opened their first display season on Hawks, but regrettably have broken the type's excellent safety record by dropping one aircraft in the sea off Brighton.

The Hawk is easy to fly, but difficult to fly well, so it could probably take over fairly economically from the top end of the Jet Provost training, leaving a yet to be defined high-performance propeller-driven aircraft as a good initial trainer. The Hawk is perhaps in the same position as the Hunter was in the mid-1950s, with a world market opening up, but with the major difference that the competition is much keener. Up to the mid-1980s the potential market for Hawk-type aircraft is 3,000, of which British Aerospace expect to obtain their fair share, with prospects of achieving some success with the U.S. Navy. This two-way street appears difficult to achieve, the usual result being equipment from the U.S.A. and money in return.

Harrier

However, the Harrier helped to reverse this trend and the elusive export sales which this revolutionary and practical aircraft richly deserves are always just around the corner. This year the Fleet Air Arm have achieved their ambition of returning to fixed-wing flying with both Nos. 800 and 899 Squadrons equipping with Sea Harriers and making use of the revolutionary and simple ski jump.

Although designed for No. 38 Group, R.A.F., operations dispersed in the battlefield, the Harrier has proved a difficult air-to-air target with the ability to vector the thrust of its Pegasus engine in flight and rapidly turn the tables on a surprised attacker. The future argument is between the U.S.-developed AV-8B and the R.A.F.-optimised Harrier Mk. 5. There is little



Panavia Tornado F.2 ZA254, first prototype of the air-defence variant, carrying four BAe Dynamics Sky Flash missiles under its fuselage plus two self-defence Sidewinders and two long-range tanks under the variable-geometry wings

doubt that, based on past experience, the AV-8B will only be produced to the benefit of the U.S.A., and any British pioneering expertise could soon be lost due to lack of funds. One hopes, however, that as the Mk.5 Harrier is tailored to demanding European requirements, a sell-out to our all-powerful ally will be avoided. The Harrier has already

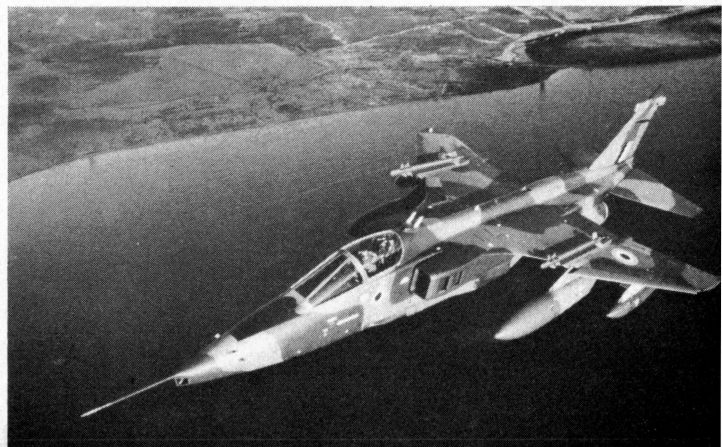
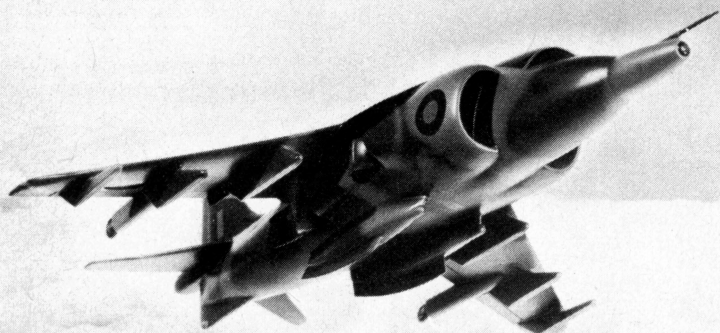
been sold in encouraging numbers to the U.S. Marines and Spanish Navy. More recently the Sea Harrier won its first export order, placed by the Indian Navy in whose service it will replace vintage Sea Hawks.

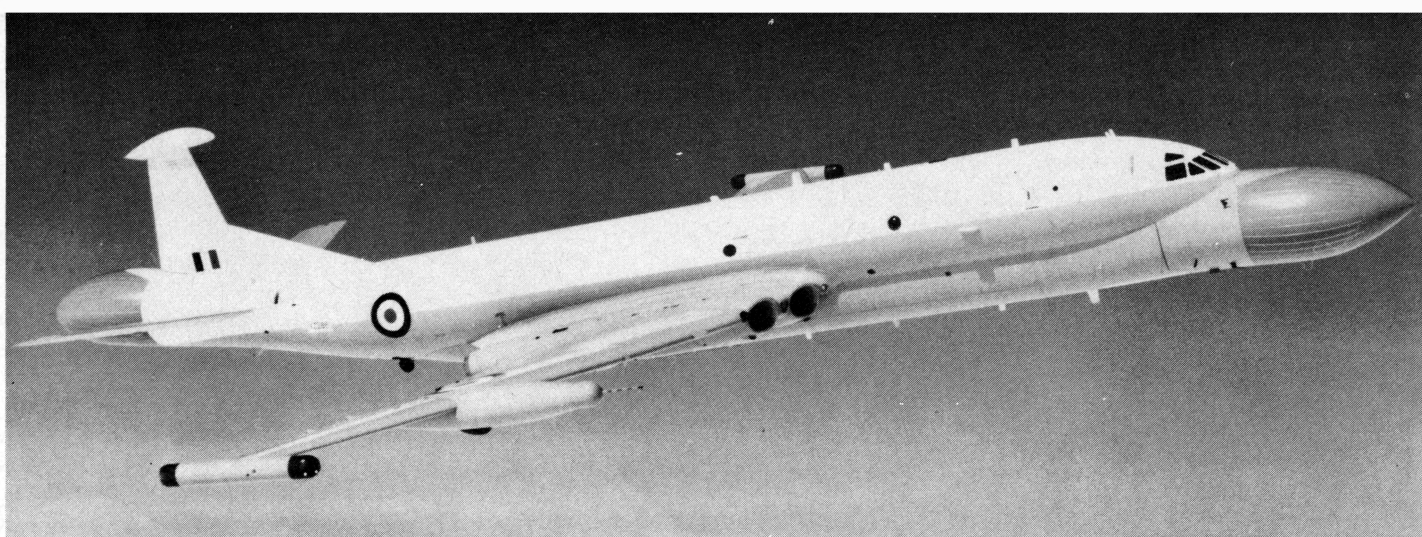
The next major requirement for the R.A.F.—and, it is hoped, some of the European allies—is an interceptor cum



Above: In June this year British Aerospace's Warton Division refurbished the last of twenty-three Canberras for the Venezuelan A.F. Illustrated is a B(1).8

Below Left: Impression of the "Big-Wing" Harrier, an economical development offering improved payload and manoeuvrability via a new wing which could be fitted to existing GR.3s and T.4s. Right: Sepecat Jaguar International in Indian A.F. colours





First of eleven Nimrod AEW.3 airborne early warning aircraft for the R.A.F., XZ286 is seen during its maiden flight from Woodford on 16th July. The Nimrod will start replacing AEW Shackletons in No. 8 Squadron in early 1982

Britain's Industry . . .

ground-attack aircraft to fill the gap between the Harrier and the more complex and expensive Tornado. With rapidly rising costs which can only be brought down by economical technology, the Hunter to Jaguar onwards replacement will have to be simple enough to be operated by a single pilot and cheap enough to be produced in large numbers. It will need rapid mobility, good endurance and great hitting power—a sort of long-range all-weather lightweight Lightning.

Anglo-French collaboration

Co-operation with West Germany, at least, seems possible, but in military terms appears almost impossible with the French. However, there must be fault on both sides, so surely some compromise can be reached, since France has so much territory to defend and a very nationalistic, aviation-minded government. In the long run, we all are defending against the same basic threat, so surely there must be a similar answer.

In collaborative projects the French have generally had their own national competitor which they have sold strongly; rather having no cake at all than half a slice. The Jaguar v. Mirage and Aérospatiale/Westland helicopter projects have both experienced this situation, but in Britain we have no nationalistic competition so fight hard to win what is, in fact, half a slice, the French automatically achieving their share. The chances are that the French cannot lose, and as a result, the product to the customer improves due to the high competitiveness. At least Britain has not tried to build V/STOL Harrier technology into any replacement dog-fighter, as not only is it not needed, but it is curiously still viewed with some suspicion and could cause collaborative deals to be stillborn.

The Anglo-French collaborative Jaguar has been sold with stiff competition from the French Mirage to a number of important overseas countries. Despite unrelated political upheavals, the Jaguar is obviously the ideal aircraft for India, although that country's capability of producing it in its own factories

appears to be in doubt at the moment. Valuable follow-on orders in Oman have obviously proved the worth of the Jaguar and it has been successfully and fully integrated into the R.A.F.

Tornado

The major European military aircraft programme is, of course, the Panavia Tornado—in some sense the long-awaited TSR-2 replacement. With combined potential requirements for 809 aircraft for Britain, West Germany and Italy, this programme is now well through its development phase and has just entered R.A.F. service. It is hard to believe that the Tornado can be the answer to all our prayers and one hopes there will not be too much of a rush to scrap the Vulcans before the Tornado has really established itself, although crew shortage might result in the aircraft being stored. The storage of surplus Lightnings has certainly paid off with the formation of a third squadron imminent.

In happier times one might have said the same for the Buccaneer, which basically is one of the world's most effective low-level strike aircraft, and by the time these words are being read, should be back in full active service. How such a tough aircraft can have such catastrophic structural problems so unexpectedly casts doubt on any fail-safe structures. The crews of these aircraft are well aware of any risks of real combat, but are unimpressed when during training the aircraft comes apart around them. If the Buccaneer problems are overcome, as is anticipated, these too must be kept in reserve, and not wasted by needless scrapping of otherwise valuable defence.

At long last our most out-dated almost W.W.II-vintage AEW Shackletons are nearing replacement by something which may cope with modern warfare. The decision to produce the Nimrod AEW.3 certainly appears to have been the right one, rather than the very expensive American equivalent.

British Aerospace's Strikemaster production line is now located at Hurn where ten aircraft are being built for "stock", to ensure rapid delivery for future customers. To date 146 Strikemasters have been sold to nine overseas air forces





An A300 Airbus in service with Bavaria Germanair, the charter operator. Airbus Industrie, in which British Aerospace are 20% partners, have so far sold 197 A300s (plus 81 options) and 71 of the new A310s (plus 68 options)



The new 18-seat Jetstream 31, G-JSSD, produced by BAe's Scottish Division at Prestwick with TPE 331-10 turboprops



Above: The first production BAe 146 feederliner has its forward cabin joined to the nose at Hatfield the day after the type attracted its first order—from LAPA of Argentina

Below: Impression of the BAe 146—due to fly in early 1981



Above: British Aerospace's 748 continues to sell well (350 ordered) and is being progressively improved

Below: Orders for the HS 125 8/14-seat executive jet total 496—Series 700 with TPE 731-3 turbofans illustrated





Left: The first BAC One-Eleven 500 fuselage about to leave Hurn for Bucharest in a Super Guppy in January to start the type's manufacture in Romania. Right: One-Eleven 500 RP-C1187 leaving Hurn last year on delivery to Philippine Airlines

Britain's Industry . . .

lent, and much as we love the Shackleton, with its Griffon engines and Lancaster parentage, in modern defence terms something less vintage is needed. The Nimrod, of course, has a fine parentage, starting with the de Havilland Comet in 1949 and developments of this original design will still be flying over 50 years later. Compare that with the Wright Brothers to the Jet Age over the first 50 years!

Before leaving BAe military activity, it might be appropriate to mention briefly the defensive weapons contribution by the Dynamics Group, who are often passed by due to their less glamorous image, but who provide around one-third of the overall turnover of the organisation.

A Tornado Air Defence Variant is worthless without its Sky Flash missiles and our R.A.F. airfields would be defenceless without Rapier and Bloodhound. These and other advanced-technology weapons are replacing the guns and proving much more effective in the process. They are high-technology pilotless airframes produced to the highest quality, and, like a bullet, must work first time, every time.

British Aerospace have commercial aircraft activities ranging from the HS 125 business jet to the Airbus programmes. The HS 125 is close to achieving its 500th sale with 496 at the time of writing and still rising. Although the more advanced Series 800, which is in fact a new aircraft, has been rumoured, it seems more likely

that the lesser step will be taken of carrying along the line of improvement of the current type.

North America has, naturally, been the major market for the HS 125 over the years, although as has happened before the market is slow at the moment. The HS 125 has now been established long enough to be making a useful commercial return to British Aerospace. The simplicity of design gives the reliability required, and the fan engines provide quiet operation, economy and range. The development of a completely new version would be a costly exercise, and so much money is now being invested in other civil projects. It also takes time to launch a new aircraft and hopefully its availability will coincide with a growing market demand.

Jetstream 31

In the Scottish Division at Prestwick the Jetstream 31 has risen from the Handley Page ashes, with a careful start of completing aircraft already partly built, for R.A.F. service. Some Jetstreams were also diverted to Royal Navy training. When the decision was made to re-engine a current aircraft with 900-s.h.p. Garrett AiResearch TPE 331-10s for development purposes before starting production, the biggest problem was locating an airframe to re-engine. The Handley Page-built aircraft were still notching up hours in regular operation, and there was a reluctance to let one go back to Scottish. This must, no doubt, be encouraging for future sales, but even restarting the

production line is a time-consuming business, which can lose sales to the often unpressurised competition.

A large Jetstream 31 order from the R.A.F. to replace aged Devons and Pembrokes seems almost certain, but if it should tie up too many early delivery positions the important civil market could suffer. Nearly sixty Jetstreams are in service, supported by Scottish, giving an encouraging base for the new product which should be with us for many years.

The HS 748 range seems to have been around almost as long as the Dakota it was designed to replace. Sales have reached 350 and comparatively minor developments keep this aircraft selling in a competitive civil and military market, where first cost, fuel economy and reliability are absolutely essential. The HS 748 in its civil and military forms continues to sell at a gradual rate, which could continue for the next two decades as fuel becomes rarer and dearer.

It is a pity that the Coastguarder HS 748 derivative is so slow to attract custom, as it appears to be a market need in which everyone is having a dabble, but for which the Coastguarder appears to be most practical. A British launch order would obviously be a great step forward, releasing Nimrods from mundane and expensive fishery patrols to their more important defensive work. It would surely be possible to pay for a useful number of Coastguarders out of the extra fuel used by Nimrods on fishery work since the cod war. Future HS 748 developments have considered

Left: Artist's impression of the new Shorts 360 36-seat commuter airliner. Right: Impression of the Airbus Industrie TA11, a four-engined 210/220-passenger wide-body project based on the A310 fuselage and with a new wing



jet power, but more likely moves are towards increasing capacity.

The BAC One-Eleven is in the twilight of its career, although recent contracts from Romania to produce the aircraft under licence are extremely valuable. No amount of hushing of the engines appears to reduce the pain, and without the unjustified change to fan-engines, the aircraft will no longer be acceptable from a noise point of view. Technically the airframe has proved very adaptable to a wide market and it has achieved good earnings. It is now finding a good home in business fleets and, fortunately, the Spey engines are reasonably fuel-efficient by jet standards. No doubt the One-Eleven will be replaced by the next generation of narrow bodies as proposed by Airbus Industrie, but with poor Boeing 757 sales, there does not appear to be an immediate future market.

BAe 146 feederliner

The first new British airliner launched in nearly twenty years is the BAe 146 which has just attracted its first order from a classic customer in Argentina, LAPA, a little-known operator who needs quiet, efficient, reliable aircraft at a reasonable price. This is not to say that the larger operators will not place substantial orders, but many more will come from these relatively unknown airlines who provide what in many cases is the only practical form of transport. These operators do not have five-year investment plans, but they know they need a couple of bigger aircraft next year. In many cases they will need to see and feel the aircraft and then place small orders as their requirements grow.

The BAe 146 is designed to replace the turbine and piston propeller types for which there is a market for well over 1,000 aeroplanes up to the mid-1990s and even if only one-third is captured the BAe 146 will be a success. The competition is the Fokker F.28 Fellowship which sells steadily, is produced to a large extent by British industry, but is now about fifteen years old. Technology and know-how must have improved over that period. Other competition may come from written-down compact jets, but their noise, fuel guzzling and growing maintenance costs, must make the BAe 146 attractive. That appears to be the major competition!

Not only are British Aerospace convinced of the BAe 146's success, but so are the collaborative partners in the U.S.A. and Sweden, who only stand to gain if the aircraft is a success. They have obviously taken sound advice to invest their hard-earned funds, expecting a good return on their investment.

Finally, with British Aerospace is the extremely successful Airbus programme. With the rest of British industry declaring redundancies and cutting back, the rapidly growing A300/A310



Delivered to Hornbill Skyways of Kuching in January, this Shorts Skyvan is used for aerial survey work in Eastern Malaysia plus "up country" transport duties



First of two Shorts 330s for Olympic Airways, SX-BGA is now at work on domestic routes in Greece and throughout the Aegean Islands—see also page 349



Above: Seen at Bembridge in May, Pilatus Britten-Norman Maritime Defender S7-AAD was delivered that month to the Seychelles Government (Photo: Peter J. Bish)

Below: Somewhat earlier the Bembridge firm supplied Inter-Island Airways (now Air Seychelles) with this Trislander Mk. III-2, VQ-SAN (now S7-AAN)





Above Left: Delivered in May, these two Westland Lynx are the first of a batch of eight for the Royal Danish Navy

Top Right: Impression of the Westland WG.34 designed as a Sea King replacement and now likely to be developed in co-operation with Agusta



Left: Westland WG.30 prototype G-BGHF in military guise transports a mortar section. Right: Seen carrying a 105-mm. gun in northern Norway, Westland/Aérospatiale Puma HC.1 XW207 of No. 33 Squadron, R.A.F., has the new engine filter intakes



Britain's Industry . . .

programme has gone on almost unnoticed. With BAe as 20 per cent partners and production rates reaching eight to ten aircraft a month by about 1984, the company is looking for more factory space and people to spread the load. Orders and options stand at around 410, although the fantastic surge of recent years has temporarily lulled. However, the market share has been an uncomfortable near second only to Boeing and even if no new airlines order, the existing operators will need more than 1,000 aircraft by the mid-1990s. Great care has to be taken to avoid building up production too rapidly, as the reduction process after a peak is very painful; but deliveries must be competitive.

The A310 is a recent addition to the family with more to follow and constant improvements are being made to the current aircraft. British expertise plays a major part, with seconded BAe personnel in at all levels on marketing, flight development, product support and many other areas. Just over 200 people are involved in the final assembly of A300s, but more will obviously be required with the growing A310 programme.

Studies continue on single-aisle aircraft which can be launched when the market is ready, and will almost certainly be assembled in Britain. Although the programme is spread widely, geographically, it is far less scattered than the wide-bodied American aircraft; and with their small organisation, Airbus Industrie are able to remain efficient and competitive, all the partners competing commercially for each new stage in the programme.

Westland helicopters

Although Westland have remained a private company, and in recent years have had well-publicised financial problems, they appear to have weathered the storm and are now coming back with renewed strength. Westland have always been successful at re-engineering other people's helicopters, and have been involved in European collaboration for many years. As with all collaboration, the home market is enlarged, but with the Lynx and its recent developments, they have shown their own capability of producing a very competitive and high-performance helicopter.

Two thousand of the three different Anglo-French collaborative helicopters (Puma, Gazelle, Lynx) have now been

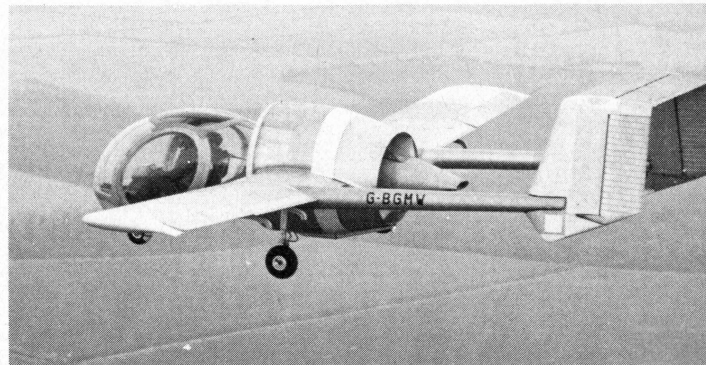
produced, and under a recent agreement with Agusta in Italy a joint company has been formed to produce the Sea King replacement. Follow-on Puma orders keep Westland's Weston factory busy, and it is encouraging that at long last it appears that suitable engine protection against dust, sand, water spray, etc. is being installed. A helicopter can be very vulnerable to anything other than air being sucked into its engines.

Westland's new WG.30 was developed apparently for the civil market, but has already reverted to a military guise, and all other Westland attempts at penetrating the civil market have died due to a greater and more profitable occupation with military production. Production runs for governments keep the cost down and there is no need to set up an enormous product support organisation to look after individual one-aircraft owners. Even the ups and downs of North Sea oil, with their varied requirements, do not appear attractive to Westland's, who work best with the fleet operator. With four main types in production gaining regular new orders, and new developments under way, Westland look healthy for the foreseeable future.

In Northern Ireland Short Brothers are a major employer and in recent



Left: The NDN-1 Firecracker trainer (prototype G-NDNI illus.) has been specially designed for licence manufacture by "young" industries overseas (Photo: Peter J. Bish). Right: BAe Scottish Division Bulldog demonstrator G-ASAL with Matra rocket pods



Left: Germany's RFB Fantrainer is propelled by a Dowty ducted fan driven by a piston engine, giving the handling properties of a jet for training purposes at much lower cost. Right: Edgley EA7 Optica G-BGMW offers superlative visibility

years have had to diversify their activities to keep their factory busy. Despite competition, first from American products for their labour force, including a false start, they appear in a stable position, fortunately largely unaffected by the political internal strife.

The Skyvan and 330 Commuter aircraft have sold steadily, but not yet in large numbers, gaining a reputation for roomy, sturdy operations, in unglamorous work. The Shorts 330 sales and options have only just passed sixty aircraft, but with vigorous selling, the aircraft should be with us for many years to come. Nevertheless, the firm has made a significant dent in the American market with its 30-seat 330 and this has obviously given the men at Belfast the confidence to launch the new 36-seat Shorts 360, to cash in further. It is hard to suggest what other lines Short's might follow, but maybe their obvious willingness to try something totally different in collaboration with an established manufacturer would pay dividends. Reims in France have had great success with Cessnas, so the aborted Short/Piper deal appeared to be an excellent answer. Short's are also heavily involved in lucrative sub-contract work particularly with Fokker, and produce pods for many jet engines.

Pilatus Britten-Norman now appear to be returning to normal operations after the financial problems which beset this lively little company on the Isle of Wight. They suffered the classic cash flow problems of an undercapitalised company which was so successful that despite plentiful orders, they could not

finance the work in progress. Their product was obviously not at fault and therefore the take-over by Pilatus of Switzerland was an unexpected, but welcome, result. News of developments on B-N products has been sparse, although at least one new item is expected to be announced at Farnborough. The Romanian production continues, although Belgium no longer takes any part.

Activities at Bembridge

The 200 or so work force at Bembridge is small, and any surplus work is spread around to keep this work force at a steady level. A new runway has recently been opened at Bembridge to avoid the water-logging experienced during the winter and new buildings are being erected to house a service centre. New developments could go a number of ways, but there is no doubt that an economic, inexpensive, rugged, reliable workhorse, such as the Islander series, has world-wide appeal. The company has now returned to a modest profitable situation and will be able to build up its strength again in a highly competitive market.

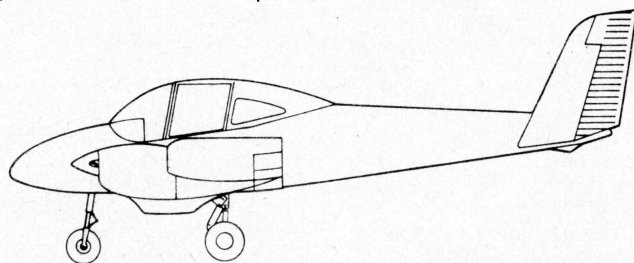
As is well known, the founders of

Britten-Norman went their own way on the liquidation of the company, and regrettably John Britten died suddenly. However, his brother took on the challenge of his ideas with the Sheriff light twin project which is now under construction by Aircraft Design at Bembridge. First flight is expected in May 1981, so there will not be any presence at Farnborough, since the important task at the moment is to complete the first aircraft and start its flight trials.

Just over on the mainland at Goodwood Aerodrome, Desmond Norman and his team with NDN Aircraft Ltd. are progressing with their Firecracker, the most likely development being a turboprop-powered version. Many detailed improvements have been made to the prototype, which has been well received, and there are encouraging steps being made towards the first technology transfer sale of a licence production agreement, the main object of the programme.

Still with the small groups, mention can be made of the Cranfield A1 and from the same airfield, the curious bug-eyed Edgley Optica. Both these aircraft, produced by talented enthusiasts, have a specialised and therefore somewhat

Something to look forward to at the next Farnborough—the late John Britten's Sheriff four-seat light twin which is now being developed and built by Aircraft Designs (Bembridge) Ltd.



Britain's Industry . . .

restricted use. The A1 is a brave attempt to keep Britain in the world-class aerobatics race, but there is little news of progress to date and future plans. One cannot see a large market, even if one were being sought, and although the American Pitts have taken over from the Czech Zlins, there is obviously a continued need for specialised aerobatic aircraft.

John Edgley's Optica is a fresh look at aeroplane design and construction, but with all the worthwhile market slots taken up by existing aircraft, or their adaptations, it may be difficult to establish credibility for an untried, unconventional aircraft, produced by an unknown organisation. In fact, the safest idea may be the one adopted by W/Cdr. Ken Wallis, who designs, builds and operates all his aircraft and does not wish to be involved with the enormous problems of other people buying and operating them. The Optica may respond to a similar outlook, at least until it is more established.

Although not aircraft manufacturers, Dowty have been involved in ducted fans originally in an adapted Islander and more recently in the RFB Fantrainer. The ducted fan has obvious advantages, but once again, the concept is not easy to sell.

Finally, we have the engine manufacturer—Rolls-Royce. They cover the range from the giant RB.211 fan-jet engine to the Gem for the Lynx. Their business is largely international, with the backbone of the home market in military engines. The RB.211 and its future developments will, no doubt, be the major programme for the company for many years to come, taking it from bankruptcy slowly back to the black.

With the Olympus engine for Concorde, we appear to have reached the ultimate in supersonic pure jet engines, any future SST engine having to be significantly quieter and more fuel-efficient. If the development is too protracted, alternative fuels may have to be found.

Development of the unique Pegasus

vectored-thrust engine continues to improve in relatively small steps, although the addition of reheat should be dramatic, but is unlikely to increase significantly unless a new Harrier-type aircraft is designed, giving room for a new engine. The Gem engine produced at Leavesden for the Lynx is proving a great success in service and probably would respond to wider applications.

In the civil sector, replacements for the Spey and Viper engines might achieve a useful market. The Viper replacement is running in pre-production form, but not committed to a firm launch. The Trent was to be a small airliner engine, but never came to reality and the M45 applications appear to have died with the VFW 614 airliner.

The HS 125 and BAe 146 are both currently available with American engines, because nothing suitable is available from Rolls-Royce.

After a very long delay the RB.211 engines have been offered as an alternative power unit for the Airbus family, but this may now be academic as there is such a broad customer base already in existence that prospects of a new customer selecting a powerplant requiring development may be remote. The General Electric CF6 and Pratt & Whitney JT9D now provide a well-proven choice. In the collaborative field, Rolls-Royce have a wide experience which, like large aircraft, is the future way to enlarge the business. Better a part of a business deal than none at all.

Full range covered

Britain therefore covers the full range of aerospace activities, from complete aircraft and engines, to collaborative programmes and sub-contracting. It is a growing industry with plenty of work, although new projects become extremely expensive and often protracted to develop, making collaboration more desirable. The buoyant British aerospace industry is a contrast to much of the remainder of industry at the moment, and should be exploited to the full.

Engine development must in the short term continue the trend of greater

economy and quieter operation, but in the longer term perhaps a new fuel or form of propulsion should be under urgent consideration.

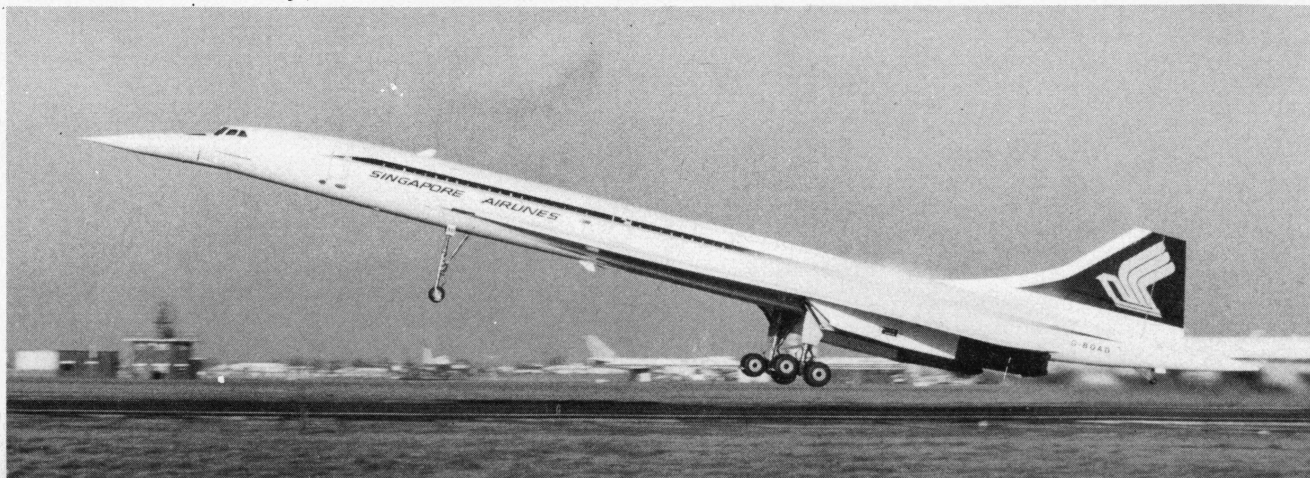
It is to be hoped that British supersonic experience can be utilised in a second-generation SST, obviously in collaboration with the Americans. SST is here to stay in some form or another. The Airbus organisation has gained credibility and will, no doubt, be the force behind future European airliner programmes. Britain can still cope nationally with the smaller commercial aircraft where desirable, but there is a credibility gap in the light touring and training market, once a British preserve, but now dominated by the Americans and the French. To start from scratch would be impossibly expensive in most cases unless something along the lines of the old Britten-Norman organisation could start with adequate financial backing and produce a competitive, simple and effective aircraft for the right price.

In the military field, the Tornado appears to be the backbone of current defence strategy with future development in the Jaguar and Harrier replacements. Perhaps more government investment in airframe development—now that Rolls-Royce have had a fair share—would pay long-term dividends in the future. The U.S.A. can make aviation pay and in a competitive Europe we could reap our reasonable share. Airbus has proved that.

The next decade will probably see continued development of existing aircraft, the only really new types being the 160-seat single-aisle Airbus and the "dogfighter", in the big league.

Although we are fortunate in Britain in having some natural resources, our real strength is the skill of turning raw materials into sophisticated products. But we seem gradually to be losing this skill, due to a lack of financial attraction to industry and the tendency in education to steer school-leavers away from engineering. For us fully to overcome our economic problems, these trends must be reversed and aerospace can lead the way.

It is to be hoped that the technological lead gained by Britain and France with the BAC/Aérospatiale Concorde will not be lost when a second-generation SST is needed. Concorde G-BOAD is seen inaugurating a joint British Airways/Singapore Airlines service from London-Heathrow to Singapore via Bahrain on 9th December 1977



TAM-80

by MALCOLM ENGLISH

ONE THOUSAND men from the air forces of seven nations participated in Tactical Air Meet 1980 (TAM-80). It was hosted at Ramstein Air Base, Germany, from 20th June to 3rd July 1980 and was the second biennial TAM to be held. Participating units in TAM-80 are shown in the table.

The first TAM, held in 1978, was derived from the merger of the Allied Air Forces Central Europe (AAFCE) Tactical Weapons Meet and the Royal Flush Reconnaissance Competition.

TAM-80 consisted of two major phases: Tactics and Competition, plus an Operational Turn-Round competition. To minimise air traffic control problems and noise, flying activities were conducted from three additional USAFE bases. Attack units operated out of Ramstein AB; reconnaissance squadrons from Zweibrücken AB; air defence fighters from Bitburg AB and the A-10 Thunderbolt IIs from Sembach.

The tactics phase involved flying offensive missions against heavily defended targets. Defences included Hawk, Blowpipe, Rapier and Chaparral surface-to-air missiles (SAMs), Gepard



McDonnell Douglas F-4E Phantom 69-249 of the 86th TFW, U.S.A.F., a resident unit, comes in to land at Ramstein. Underwing stores include drop tanks, a practice bomb carrier and Pavé Spike laser designator (Author's photos)

and Vulcan anti-aircraft artillery (AAA), and fighter patrols. To help counter the defences, mission leaders had two "Wild Weasel" F-4G Phantoms at their disposal and strike aircraft were allowed to deploy "chaff". Mission effectiveness was determined from analysis of video films taken from cameras mounted on SAM and AAA sites,

gun-camera films and information from target observers.

Typical of the sorties was a strike on the Canadian Forces Base at Baden Soellingen. A-10s of the 81st Tactical Fighter Wing, USAFE, opened with an attack on the base anti-aircraft batteries. Having "softened up" the defences, Starfighters from JBG 32 of the Luft-

TAM-80 PARTICIPANTS

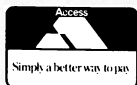
Nation	Unit	Home Base	Aircraft	Mission
Belgium	2 Sqn.	Florennes	5×Mirage 5BA	Attack
	42 Sqn.	Florennes	3×Mirage 5BR	Recce.
Canada	1 AWX Wing	Beauvechain	5×F-16	Air Defence
	1 CAG	Soellingen	5×CF-104	Attack
	JBG 31	Norvenich	5×F-104G	Attack
	JBG 32	Lechfeld	5×F-104G	Attack
	AG 51	Bremgarten	3×RF-4E	Recce.
Netherlands	JG 74	Neuburg	3×F-4F	Air Defence
	306 Sqn.	Volk	3×RF-104	Recce.
	20/31 Sqn.	Bruggen	5×Jaguar	Attack
United Kingdom	2 Sqn.	Laarbruch	3×Jaguar	Recce.
	19/92 Sqn.	Wildenrath	3×Phantom FGR.2	Air Defence
United States	86th TFW	Ramstein	5×F-4E	Attack
	26th TRW	Zweibrücken	3×RF-4C	Recce.
	10th TRW	R.A.F. Alconbury	3×RF-4C	Recce.
	81st TFW	R.A.F.		
	36th TFW	Bentwaters	5×A-10A	Attack
France (guests)	Esc. 13	Bitburg	5×F-15	Air Defence
	Esc. 33	Colmar	5×Mirage 5F	Attack
		Strasbourg	3×Mirage IIIR	Recce.

TAM-80 RESULTS

Task	Winner
Reconnaissance	4 ATAF "B" Team comprising Belgian A.F., German A.F., R.A.F. and U.S.A.F.
Strafe	81st TFW, USAFE (A-10A) with 42 points out of possible 50
Rocket	1 CAG (CF-104) with 180 points out of possible 200
Low-level retard and Toss bombing	86th TFW, USAFE (F-4E) with 372.7 points out of possible 400
Visual lay-down bombing	31 Sqn. R.A.F. (Jaguar GR.1) with 200 points out of possible 200
Visual retard and Toss bombing	86th TFW, USAFE (F-4E) with 186.7 points out of possible 200
Low-level, shallow-angle bombing	31 Sqn., R.A.F. (Jaguar GR.1) with 400 points out of possible 400
Operational turn-round	1 CAG, No. 3 FBW (CF-104)
Hunter Trophy	
Vulcan Trophy	
Walker Trophy	
Canberra Trophy	
Best individual score	
Best individual score	
Broadhurst Trophy	
Best score	

Left: French A.F. Dassault Mirage 5F "13-PB" of the 13e Escadre from Colmar in a shelter at Ramstein. Right: R.A.F. ground crew unloading a 1,000-lb. practice bomb from the starboard outer wing pylon of No. 31 Squadron Jaguar GR.1 XX970





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Two General Dynamics F-16As (FA-12 nearer) of No. 1 Wing, Belgian A.F., taking off from Bitburg as part of the air-defence force

TAM-80...

waife and 1st Canadian Air Force Group, together with F-4E Phantoms of the 86th TFW, USAF, carried out a high-speed, low-level attack on the airfield. Fighter defence aircrews commented on the difficulty of attacking mixed formations, the problem being that the various strike aircraft had a wide performance range—particularly acceleration and turning radii.

The competition phase of TAM-80 was divided into two major areas: weapons delivery and navigation and tactical air reconnaissance. Two international teams were formed for both of these major areas. An operational turn-round competition was held for the first time in a TAM. It consisted of rearming and servicing, including refuelling, aircraft in readiness for a mission and was performed with combined servicing and weapons loading teams of between five to seven technicians.

Emphasis was placed on promoting understanding among allied aircrew and testing the operability of air forces within the European central region. This differs somewhat from similar tactical meets where the competitive element is almost paramount. Multi-national strike forces such as the one mentioned previously in the attack on Baden Soellingen certainly helped promote air-

crew understanding and highlighted some minor problems—particularly communications/language difficulties. Nevertheless, the high competition scores bear witness to the abilities of the participating crews.

Improved F-15s for USAF

U.S.A.F. UNITS in Europe at present flying the McDonnell Douglas F-15 Eagle are to receive improved versions of this air-superiority fighter—the F-15C single-seater and two-seat F-15D combat-capable trainer, which have more advanced radar and 2,000 lb. more internal fuel capacity.

First to re-equip will be the 32nd TFS at Camp New Amsterdam, Soesterberg, Holland, which will start receiving the new models this summer; the 32nd comes under the control of the R. Netherlands A.F., the only U.S.A.F. unit under a foreign air force.

Later the 36th TFW at Bitburg, West Germany, will re-equip its three squadrons (22nd, 53rd and 525th TFSs). The entire conversion is scheduled to be completed by autumn 1981.

The Austrian A.F.'s 1 Staffel of Fliegerregiment 3 at Linz-Hörsching is now re-equipping with twelve Augusta-Bell AB 212 helicopters, replacing AB 204Bs. Another twelve AB 212s are destined for Tulln-Langenlebern.

Two R.A.F. Jaguar GR.1s of No. 20 Squadron take off from Ramstein. One of their companion units in the Tactical Air Meet, No. 31 Squadron, gained full points in two of the events and won the Broadhurst Trophy





One of USAir's Boeing 727-200s, N760AL

Airlines of the World

by GÜNTER G. ENDRES

USAIR

USAir (Flight code AL)
USAir Inc., until 28th October 1979 known as Allegheny Airlines, was established in 1937 as All-American Aviation. Operations began on 13th September 1938 with Stinson Reliants, providing "pick-up" airmail services radiating from Pittsburgh, Pennsylvania, to a number of small north-eastern communities in the Allegheny mountains. These mail services were discontinued in 1949 and the company started scheduled passenger flights on 7th March to Washington, and to other points in Pennsylvania, Maryland, New Jersey and New York. The name Allegheny Airlines was adopted in 1953.

The airline expanded steadily and, following mergers with Lake Central Airlines in 1968 and Mohawk Airlines in 1972, became the nation's largest regional air carrier. The biggest expansion, however, has taken place since the end of 1978 when as a direct result of "de-regulation", Allegheny reached out further than ever before to take in major cities in the south, and as far west as Phoenix, Arizona. It is this increased network which prompted the airline to choose a more encompassing name, and USAir was officially adopted.

The airline's route system now spans North America from the clear lakes of Canada to the Gulf of Mexico, as far north as the peaks of Vermont, down the Atlantic coast from Boston and New York City to the beaches of Florida, and west to Arizona's Grand Canyon, including more than 100 cities in 25 states and two Canadian provinces. USAir will carry more than 14,000,000 passengers this year.

From 1967 onwards some of its smaller routes were transferred to local commuter airlines and these continue under the "Allegheny Commuter" label. Twelve commuter airlines now provide "Allegheny Commuter" services over the world's largest independent commuter network to more than 50 mostly smaller and medium-sized communities. Around 2,000,000 passengers are carried annually.

Head Office: Washington National Airport, Washington, D.C. 20001, U.S.A. Telephone: (202) 892-7000. Telex: 8922645.

Reg'n.	Type	c/n.	Previous identity/Remarks
N1112J	BAC One-Eleven 204AF	030	
N1113J	BAC One-Eleven 204AF	031	
N1114J	BAC One-Eleven 204AF	032	
N1115J	BAC One-Eleven 204AF	082	
N1117J	BAC One-Eleven 204AF	099	
N1118J	BAC One-Eleven 204AF	100	
N1119J	BAC One-Eleven 204AF	101	
N1120J	BAC One-Eleven 204AF	102	
N1122J	BAC One-Eleven 204AF	103	
N1123J	BAC One-Eleven 204AF	104	
N1124J	BAC One-Eleven 204AF	134	G-AWDF
N1125J	BAC One-Eleven 204AF	135	
N1126J	BAC One-Eleven 204AF	179	
N1127J	BAC One-Eleven 204AF	180	
N1128J	BAC One-Eleven 204AF	181	
N1129J	BAC One-Eleven 204AF	182	
N1130J	BAC One-Eleven 215AU	096	N11181
N1131J	BAC One-Eleven 215AU	097	N11182

N1132J	BAC One-Eleven 215AU	105	N11183
N1134J	BAC One-Eleven 203AE	045	N1551
N1135J	BAC One-Eleven 203AE	046	N1552
N1136J	BAC One-Eleven 203AE	071	N1554
N1542	BAC One-Eleven 203AE	016	
N1544	BAC One-Eleven 203AE	018	
N1545	BAC One-Eleven 203AE	019	
N1546	BAC One-Eleven 203AE	020	
N1547	BAC One-Eleven 203AE	041	Note All One-Elevens are being withdrawn
N1548	BAC One-Eleven 203AE	042	
N1549	BAC One-Eleven 203AE	043	
N2111J	BAC One-Eleven 204AF	029	
N7028U	Boeing 727-22	18320	
N7033U	Boeing 727-22	18325	
N7034U	Boeing 727-22	18326	
N7035U	Boeing 727-22	18327	
N7044U	Boeing 727-22	18851	
N7046U	Boeing 727-22	18853	
N7048U	Boeing 727-22	18855	
N7049U	Boeing 727-22	18856	
N7050U	Boeing 727-22	18857	
N7052U	Boeing 727-22	18859	
N753AL	Boeing 727-22C	19203	
N760AL	Boeing 727-2B7	21953	N7428U
N762AL	Boeing 727-2B7	21954	
N770AL	Boeing 727-2B7	22162	On order
N771AL	Boeing 727-2B7	22163	On order
N772AL	Boeing 727-2B7	22164	On order
N920VJ	Douglas DC-9-31	48138	On order
N921VJ	Douglas DC-9-31	48139	On order
N922VJ	Douglas DC-9-31	48140	On order
N923VJ	Douglas DC-9-31	48141	On order
N924VJ	Douglas DC-9-31	48142	On order
N925VJ	Douglas DC-9-31	48143	On order
N926VJ	Douglas DC-9-31	48144	On order
N927VJ	Douglas DC-9-31	48145	On order
N928VJ	Douglas DC-9-31	48131	
N929VJ	Douglas DC-9-31	48118	
N930VJ	Douglas DC-9-31	45868	N8953E
N931VJ	Douglas DC-9-31	47188	N8954E
N932VJ	Douglas DC-9-31	47189	N8955E
N933VJ	Douglas DC-9-31	47216	N8958E
N934VJ	Douglas DC-9-31	48114	
N935VJ	Douglas DC-9-31	48115	
N936VJ	Douglas DC-9-31	48116	
N937VJ	Douglas DC-9-31	48117	
N938VJ	Douglas DC-9-31	48119	
N939VJ	Douglas DC-9-31	48120	
N940VJ	Douglas DC-9-31	47053	N970NE
N941VJ	Douglas DC-9-31	47054	N971NE
N942VJ	Douglas DC-9-31	47057	N972NE
N943VJ	Douglas DC-9-31	47058	N973NE
N945VJ	Douglas DC-9-31	47066	N974NE
N946VJ	Douglas DC-9-32	47026	N3317L
N950VJ	Douglas DC-9-31	47564	
N951VJ	Douglas DC-9-31	47576	
N952VJ	Douglas DC-9-31	47574	
N953VJ	Douglas DC-9-31	47583	
N954VJ	Douglas DC-9-31	47590	
N955VJ	Douglas DC-9-31	47593	
N956VJ	Douglas DC-9-31	47588	N54630
N957VJ	Douglas DC-9-31	48146	On order
N958VJ	Douglas DC-9-31	48147	On order
N960VJ	Douglas DC-9-31	47505	
N961VJ	Douglas DC-9-31	47506	
N962VJ	Douglas DC-9-31	47507	
N963VJ	Douglas DC-9-31	47508	
N964VJ	Douglas DC-9-31	47373	
N965VJ	Douglas DC-9-31	47374	
N966VJ	Douglas DC-9-31	47420	
N967VJ	Douglas DC-9-31	47375	
N968VJ	Douglas DC-9-31	47429	
N969VJ	Douglas DC-9-31	47421	
N970VJ	Douglas DC-9-31	47050	
N971VJ	Douglas DC-9-31	47051	
N972VJ	Douglas DC-9-31	47052	
N973VJ	Douglas DC-9-31	47099	
N974VJ	Douglas DC-9-31	47130	
N975VJ	Douglas DC-9-31	47146	
N978VJ	Douglas DC-9-31	47371	
N979VJ	Douglas DC-9-31	47372	
N984VJ	Douglas DC-9-31	47207	
N985VJ	Douglas DC-9-31	47208	
N986VJ	Douglas DC-9-31	47209	
N987VJ	Douglas DC-9-31	47210	
N989VJ	Douglas DC-9-31	47212	
N991VJ	Douglas DC-9-31	47310	
N993VJ	Douglas DC-9-31	47332	
N995VJ	Douglas DC-9-31	47334	Five more DC-9-31s on order, c/ns.
N996VJ	Douglas DC-9-31	47335	48155-48159
N997VJ	Douglas DC-9-31	47336	



One of Olympic Airways' two Short Skyvans, SX-BBO "Isle of Skiathos". Since 1971 they have been part of the light aircraft division

Olympic Airways Domestic Services

DAVID OLIVER samples a flight to Zakynthos

THE DAY on which I boarded Olympic Airways Flight OA640 from Athens to the Island of Zakynthos in early April was also the twenty-third anniversary of Greece's national airline's first scheduled flight. Olympic Airways began operations on 6th April 1957, with fourteen Douglas DC-3s and a DC-4.

These aircraft were soon joined by the first of five DC-6Bs which inaugurated Olympic's international services, and since that time Olympic's route network has grown to over 70,000 km. flown by a fleet of forty-seven aircraft, which today include two Boeing 747-200Bs and five Airbus A300B4s.

However, the bulk of Olympic's

passengers—nearly 3½ million in 1979—travel on the airline's less glamorous, but to the Greek people, more important domestic services, which serve the many islands and outlying communities spread over Greece's 51,000 square miles. For thirteen years these routes were flown by the DC-3s, with the DC-6Bs operating the longer and denser services, such as Athens-Corfu and Athens-Rhodes, in the 1960s.

In 1968 a 37-seat Aérospatiale SA.321F Super Frelon was put into service flying from Athens to the islands of Skiathos, Chios, Mykonos and Spetsai, but it was replaced in 1970 by two 14-seat Short Skyvans.

The 1970s saw extensive modernisation of Olympic's fleet including the introduction of Boeing 720Bs which replaced the DC-6Bs on a number of important domestic routes, and six Boeing 727-284s, which were added soon after.

Since the early 1960s Olympic have operated a number of light twins, such as a Piaggio P.136L amphibian, and these were available for charter. Then, in 1971, Olympic formed a separate company called Olympic Aviation Inc. with a fleet of five light taxi aircraft, plus the two Short Skyvans, two Alouette IIs and an Alouette III. This fleet now consists of three Alouette IIs, a Piper Aztec, two Piper Cherokees, a Britten-Norman Islander (which also flies a daily scheduled service from Athens to Sparti) and the two hard-working Skyvans that fly seven daily schedules apart from being available for charter.

The reliability of the Skyvans has obviously influenced Olympic's choice of the Shorts 330, which will be one of their main types for the 1980s; two 330s are being delivered this year and the airline has options on a further four. The other major type chosen as a replacement in Olympic's domestic fleet, to supersede the current N.A.M.C. YS-11As, Boeing 720Bs and Boeing 727s, is the Boeing 737-284. Four of these 122-seat aircraft are already in service and another five are on order, with options on two more.

Trip in a "Nihon"

Meanwhile, the Japanese-built YS-11A (known locally as "Nihon") remains the workhorse of Olympic's domestic routes and it was on one of these aircraft that I flew to the island of Zakynthos in April this year. My journey began at the West Air Terminal of Athens' Hellinikon Airport, which serves all Olympic Airways flights; both the international and domestic departure lounges are right next door to each other, while all other airlines use the East Air Terminal which is situated a coach ride away on the other side of the airport.

After braving the rather frantic check-in desks and going through the departure gate, I was greeted by the sight of the entire YS-11A fleet lined up on the ramp, which bore witness to the Nihon's reliability after ten years' hard service. Flight OA640 to Zakynthos was one of fifteen daily scheduled flights flown by the Nihons, and I was soon climbing the steep integral passenger steps into SX-BBG and settling into one of the 64 large and comfortable seats.

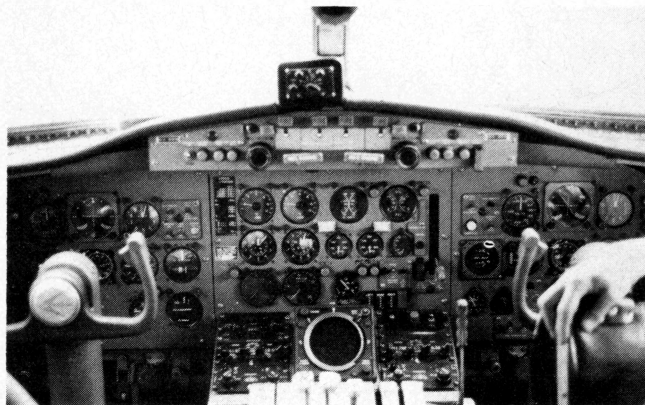
No sooner seated than we were informed that there would be a 50-

Boeing 737-284 SX-BCA "Apollo" is one of four already in service on Olympic's domestic routes and another five aircraft of this type are on order





Left: NAMC YS-11A SX-BBG "Isle of Cephallonia", in which the author flew, at Zakynthos — an island reached by a 55-minute flight from Athens. Right: Another of Olympic's YS-11As, SX-BBP "Isle of Andros", taking off from Hellinikon Airport, Athens (Author's photos)



Left: The YS-11A's cockpit. Right: The local priest and other passengers boarding YS-11A SX-BBG at Zakynthos Airport (Author's photos)

minute delay (for a 55-minute flight) and that smoking would be permitted for those passengers sitting on the right-hand side of the aisle. Five minutes later the "No smoking" sign reappeared and the Rolls-Royce Dart engines were started up.

The YS-11A is probably the heaviest twin-turboprop ever put into production, weighing as much as a Viscount, but also having as much power as a Viscount, provided by only two 3,060-e.h.p. Rolls-Royce Dart 542-10Ks, which give it a good STOL performance plus good economy. The aircraft's low initial cost, compared with that of the HS 748 or Fokker F.27 Friendship, made it an attractive replacement for Olympic's piston-engined fleet.

The YS-11A has the typically almost ugly but purposeful look that characterises many Japanese products, with its DC-8 type nose and the engines mounted over the wing above a very large wheel-well. The passenger cabin is spacious, although the windows were obviously designed for the Japanese passenger; the top of the window was level with my shoulder and the best way to see out properly would have been to sit on the floor. The toilet is also worthy of note as being one of the largest yet experienced aboard an aircraft, with its main equipment surmounted by an enormous square seat.

Meanwhile Flight OA640 had begun



Above: First of Olympic Airways' two new Shorts 330s, SX-BGA "Isle of Patmos"

Below: Olympic's Britten-Norman BN-2A Islander, SX-BBS "Isle of Kythira"





Above: YS-11A SX-BBG at Zakynthos with a Piper Cherokee Archer II, SX-AKI (Author's photo). Below: One of Olympic's original DC-3s

Olympic Airways . . .

with the stewardesses giving a demonstration of seat-belt fastening, as a change from the more usual life-belt drill, and we were soon climbing away from Hellinikon's runway 15L and out over the Gulf of Saronikos, heading due west for Zakynthos. We then began a slow, and rather noisy climb to our cruising altitude of 15,000 ft. This took us over Corinth and the snow-covered peaks of the 7,000 ft. Mt. Killini and the 6,700 ft. Mt. Erimanthos in northern Peloponnisos, followed by a long descent across the coastal plain to Zakynthos which is 10 miles out from the mainland.

Captain Nicolaidis circled the picturesque town of Zakynthos and bought the Nihon down on runway 35, which begins almost on the island's main sandy beach. He then taxied SX-BBG up to a small white building which serves as the village shop/café cum airport office and arrival/departure

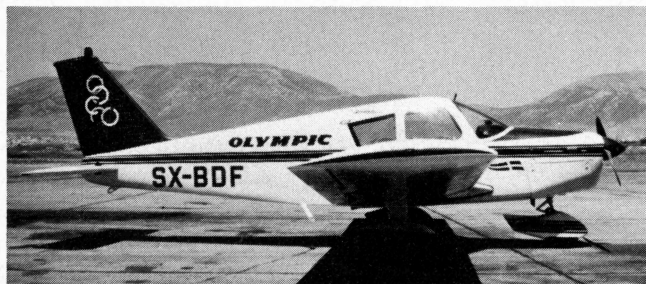


lounge. An impressive new complex of terminal buildings and control tower was being built next to the old building and was due to be operational by mid-1980.

The 180-mile journey from Athens to Zakynthos, which is situated about 120 miles south of Corfu, had taken 50 minutes, which despite the initial delay in take-off of 5 minutes, had arrived on schedule.

Some time later I re-boarded

SX-BBG, named the "Isle of Cephalonia", for the return journey to Athens, and was joined on board by the local priest who blessed the despatcher, the stewardesses and the pilots—which did much to reassure the other passengers. The only eventful thing that happened on the flight back was my spilling my glass of orange juice when I discovered that there are no trays fitted on the Nihons and drinks have to be held or put on the floor!



Above: An Olympic Aviation Piper Cherokee. Current fleet includes two Cherokees, SX-BDM and SX-BDK

Below: The Alouette III formerly used by the light aircraft division, which now has three Alouette IIs



Olympic Airways aircraft used on domestic services

Reg'n.	Type	Name
SX-CBA	Boeing 727-284	"Mount Olympus"
SX-CBB	Boeing 727-284	"Mount Pindos"
SX-CBC	Boeing 727-284	"Mount Parnassus"
SX-CBD	Boeing 727-284	"Mount Helicon"
SX-CBE	Boeing 727-284	"Mount Athos"
SX-CBF	Boeing 727-284	"Mount Taygetus"
SX-BCA	Boeing 737-284	"Apollo"
SX-BCB	Boeing 737-284	"Hermes"
SX-BCC	Boeing 737-284	"Hercules"
SX-BCD	Boeing 737-284	"Hephaestus"
SX-DBG	Boeing 720B	"Axios River"
SX-DBH	Boeing 720B	"Acheloos River"
SX-DBI	Boeing 720B	"Pinios River"
SX-DBK	Boeing 720B	"Strimon River"
SX-DBL	Boeing 720B	"Evros River"
SX-DBM	Boeing 720B	"Aliakmon River"
SX-DBN	Boeing 720B	"Nestos River"
SX-BBG	N.A.M.C. YS-11A 220	"Isle of Cephalonia"
SX-BBH	N.A.M.C. YS-11A 220	"Isle of Ithaca"
SX-BBI	N.A.M.C. YS-11A 220	"Isle of Samothraki"
SX-BBK	N.A.M.C. YS-11A 220	"Isle of Zakynthos"
SX-BBL	N.A.M.C. YS-11A 220	"Isle of Delos"
SX-BBP	N.A.M.C. YS-11A 220	"Isle of Andros"
SX-BBN	Short SC-7 Skyvan	"Isle of Mykonos"
SX-BBO	Short SC-7 Skyvan	"Isle of Skiathos"
SX-BGA	Shorts 330	"Isle of Patmos"
SX-BGB	Shorts 330	
SX-BBS	Britten-Norman BN-2A Islander	"Isle of Kythira"
SX-BDL	Piper PA-23 Aztec	
SX-BDM	Piper Cherokee 160	
SX-BDK	Piper Cherokee 160	
SX-HAH	Aérospatiale Alouette II	
SX-HAI	Aérospatiale Alouette II	
SX-HAN	Aérospatiale Alouette II	



P.F.A. Rally at Leicester

Photos by JOHN WARE

THIS YEAR'S annual International Rally organised by the Popular Flying Association was the second to be held at Leicester East aerodrome and, although the weather could have been better, a record number of 2,400 movements was recorded between 4th and 6th July. Ten overseas countries contributed sixty-nine visiting aircraft, including a large contingent from the Danish KZ Club.

Top Left: Among the many attractive biplanes at Leicester was Stolp Starduster G-AYMA. Right: Beautifully finished Bouvrieul P.50 HB-YBF belonging to Michel Suignaux came second to VariEze G-LASS in the "Best Homebuilt" class



A problem for the recognition experts—K. Szep's HFC.125 G-BCPX won the award for the best original design



Above Left: Rand KR.2 G-BEKR, which was shown in a semi-complete state last year, may have flown by the time this issue appears. Right: Monnet Sonerai G-BOBY appears to be the first of its type to be completed in Britain

Below Left: Surprisingly, the immaculately turned-out EAA Acro Sport, G-BJHK, in its brilliant blue and yellow colour scheme failed to win an award. Right: The minute Oldfield Baby Great Lakes G-BGEI won two awards for its builder, David Greenwood—it came first in the Concours d'Elegance and third in the "Best Homebuilt" section



Worthwhile role for R.A.F. Reserves

by JOHN WILKINSON, M.P.

SIGNIFICANT IMPROVEMENTS have recently been made in Britain's Reserve Forces. The Territorial Army has been reconstituted, Regiment squadrons of the Royal Auxiliary Air Force have been formed, and the Royal Navy has, under the auspices of the R.N.R., re-established its Reserve Air Branch.

The regular reserves of the Army and the Royal Navy are being rationalised to facilitate their mobilisation in time of emergency or war. No plans exist, however, for any significant expansion of the Royal Air Force in wartime. There are in fact grave doubts whether the Service, which has no operational reserve with a flying commitment except for "Shadow" squadrons of the Tactical Weapons Units, could sustain protracted hostilities at the high levels of attrition which must be envisaged in today's operational air environment.

R.A.F. planning assumes that any future war will be short. This is a legacy of the strategy of the Great Nuclear Deterrent whereby in an age of overwhelming strategic nuclear superiority the combined strike capabilities of the U.S.A.F.'s Strategic Air Command and the R.A.F.'s Bomber Command disposed of a threat of massive nuclear retaliation to any act of Soviet aggression.

However, since 1968 NATO's primary strategy has been one of flexible response. In an age of nuclear parity, verging on inferiority on the part of the West, deterrence resides more than ever in NATO's possessing a spectrum of military capability which will enable the West to react in an appropriate and effective manner to any act of aggression by the Warsaw Pact.

Britain's defence strategy is inhibited in two main ways. First, since Britain has relied on long-serving regular forces, expenditure on personnel has assumed a major proportion, just under

half, of a limited defence budget. Furthermore, equipment costs have risen sharply. In particular the cost of the Polaris improvement and Trident programmes will put severe constraints on the funding of vital conventional weapon systems.

Secondly, the single largest item in the British defence budget is expenditure on the British Army of the Rhine. This fixed and somewhat inflexible British military presence in Continental Europe is of course a treaty obligation on the United Kingdom and of great political significance for Alliance solidarity, but it is questionable whether BAOR as presently constituted represents the most cost-effective means we can deploy of deterring or, if necessary, repelling a Warsaw Pact attack on the Central Front.

Brussels Treaty

A review of national responsibilities within NATO is long overdue. The amendment of the Brussels Treaty, which will enable the West German Navy to play a role in the Eastern Atlantic, is welcome, but Britain also needs to be liberated from an immutable commitment of four Army divisions in Central Europe which owes more to immediate post-war history than to any up-to-date analysis of how Britain's armed forces today can best contribute to the security of the Alliance as a whole.

The military resources of BAOR are inherently inflexible and could not at present be readily assigned either to the Allied Mobile Force for use on the flanks of NATO in Europe, or further

John Wilkinson is a former Vice-Chairman of the Conservative Parliamentary Aviation Committee and Secretary of the Conservative Defence Committee. His article is based on a feature which he wrote originally for *The Daily Telegraph* and which appeared in that paper on 1st August 1980.

afield outside Europe to protect British and Alliance interests.

Only air forces offer the flexibility to achieve a quick response to any threat, whether within the NATO theatre or beyond. However, the R.A.F. lacks the aircraft and trained crews to fulfil the kind of mobile strategy which is appropriate to a maritime nation with substantial overseas interests.

As financial resources are in current economic circumstances strictly limited, measures to augment the combat capability of the R.A.F. should be aimed at minimising administrative overheads in favour of expenditure on additional aircraft and crews. To do this effective reserves with an operational flying commitment should be reconstituted within the R.A.F.

There are two basic requirements. First, following the previous Administration's Defence Review the R.A.F.'s transport force is gravely deficient. Even the deployment of the British element to the Commonwealth ceasefire force, with its supporting equipment, from the United Kingdom to Zimbabwe was beyond the capability of the R.A.F., which had to rely on the U.S.A.F., to carry out about one-third of the airlift.

The Government recognises that in emergency or war it must have powers to requisition civil transport aircraft to supplement the R.A.F.'s transports. Legislative provisions to do this have recently been approved by Parliament in the Civil Aviation Act. However, unless the aircrews concerned are prepared to fly to a war zone and are subject to the disciplines of the Air Force Act, serious difficulties could arise.

For that reason civil aircrews, who in peacetime volunteer for emergency duties and would be mobilised with their aircraft for transport duties in time of war, should be required to become members of the Royal Air Force Volunteer Reserve. As such they would become liable to military discipline. They would have a regular but not too onerous training commitment, including an annual overseas deployment using their own civil aircraft as military transports.

The reassignment of an important war role for R.A.F.V.R. personnel will be a major reform which will not only bring operational benefits for the Service but also increase the availability of assignable civil transport aeroplanes in emergency or war and secure closer contact between the many people in the civil community currently engaged in air transport and the R.A.F.

Nevertheless, the most important reform of all will be the recreation of flying squadrons within the R. Auxiliary A.F. equipped with Hawk aircraft. These squadrons would constitute one or a number of close air support wings would could be swiftly assigned to the reinforcement of any sector of the NATO front or, in view of the Hawk's

British Aerospace Hawk XX205 with AIM-9L Sidewinder air-to-air missiles. About 100 Hawks are being modified to carry these missiles to boost U.K. air defence



long ferry range, be used as a rapid intervention force in support of Western allies or interests in Africa and Asia.

More than any other measure the formation of such close air support squadrons would be a most cost-effective way of strengthening British defences against the armoured formations of the Warsaw Pact on the Central Front in Germany. They would be a more flexible and appropriate British contribution than are the large number of relatively immobile units of BAOR with their married quarters, schools, NAAFI shops, swimming pools and other costly impedimenta of peacetime military garrisons.

Furthermore, it is not hard to envisage a situation in which northern Norway, the Baltic, the Mediterranean, Balkans or Turkey could, just as much as the Central Front in Europe, become the scene of a Warsaw Pact military initiative to which the despatch or mobilisation of R. Auxiliary A.F. squadrons could be a very appropriate reaction.

Crises also in, for example, the Arab/Iranian Gulf or in key friendly countries in Africa could require a British military contribution of offensive support aircraft. If R.A.F. regular squadrons were despatched the R. Auxiliary A.F. Hawk squadrons could be mobilised to "hold the fort" at home, as happened at the height of the Korean War when regular air force squadrons were sent to Korea. Equally, in a permissive air environment overseas it might be more economical and effective to deploy R. Auxiliary A.F. Hawks than Jaguars or Harriers from regular R.A.F. squadrons.

Central Front

Even on the Central Front in Europe relatively unsophisticated offensive support aircraft like the Hawk can make a significant contribution to NATO defence. In a fluid war situation and, particularly near the battle area, there are positive merits in deploying large numbers of relatively cheap and rugged ground-attack aircraft to take on enemy armour and such targets of opportunity as may arise. Of course, it is vital that adequate numbers of high-performance aeroplanes should also be available to maintain air superiority and to eliminate key objectives and those targets whose acquisition from a navigational point of view would be difficult or impossible particularly in bad weather and at night.

There are, however, aircraft comparable to the Hawk in front-line service with a number of Western air forces. The *Luftwaffe* is re-equipping its Fiat G.91 squadrons with Dassault-Breguet/Dornier Alpha Jets. The Israeli A.F. retains the McDonnell Douglas A-4 Skyhawk in service and although the U.S.A.F.'s Fairchild A-10 Thunderbolt II relies on multiple systems, armour and fail-safe construction for its survival, its speed over the target is less than that of the Hawk and its target size is greater.



Hawk T.1 XX192 of No. 1 T.W.U., Brawdy, unleashes eighteen 68-mm. SNEB rockets. The aircraft wears the colours of No. 234 ("Shadow") Squadron

It is noteworthy that over half the aircraft of Tactical Air Command in the U.S.A.F. are flown by the Air National Guard. Likewise over half of the Continental Air Defence of the U.S.A. is assured by the National Guard. A.N.G. squadrons in the U.S.A. fly sophisticated high-performance aircraft such as the McDonnell Douglas F-4 Phantom, Vought A-7 Corsair and "Century"-series fighters. Reservists in both the Swiss and Israeli Air Forces fly high-performance jet aeroplanes and the Israeli A.F. has had an exceptionally good operational record.

In the Air National Guard in the U.S.A. some 70 per cent of the pilots are ex-regulars and this would be the pattern for the R. Auxiliary A.F. Indeed, unless a scheme of this kind is instituted, the restoration of short service commissions by the R.A.F. will prove a wasteful means of rectifying the serious pilot shortage which has arisen in the Service and which is now no less than 13 per cent. The R. Auxiliary A.F. Hawk squadrons would recruit pilots leaving the Service after 8 or 12 years duty on short service commissions or at the age 38/16 years service point for those on permanent commissions. The high experience levels and motivation of the Auxiliary A.F. aircrew would help to offset the lack of outright performance and sophisticated nav/attack systems of their aircraft.

A pool of highly trained pilots in current flying practice would be available which could either be mobilised by squadrons in times of emergency, or Auxiliary pilots could be sent on conversion courses for front-line aircraft types such as the Jaguar, Phantom, Harrier, etc., according to their previous flying background. The Auxiliary A.F. close support squadrons could in time of tension be used as additional Tactical Weapons Units to refresh former fast jet pilots currently on ground tours or who have recently left the Service, without interrupting the normal fast jet training at Chivenor and Brawdy.

The R.A.F. must realise that its most precious resource is its skilled man-

power. Financial constraints will always place a numerical limit on the strength of the front-line. The Service's fighting capabilities will therefore be particularly dependent on the quality of its personnel. At present the national investment in costly flying training is not yielding its full return, because regular engagements are not being followed by any reserve commitment and training.

Flexibility

It is always difficult to predict the nature of future warfare but prudent military planners should seek to create fighting services which are flexible and capable of meeting as wide a range of eventualities as possible. The capability of conducting protracted hostilities at high levels of attrition is fundamental to any realistic preparation of the R.A.F. to meet contemporary military contingencies. To achieve that basic objective the recreation of effective reserves of the kinds advocated in this article is a vital prerequisite.

The existing Maritime Headquarters Units and Regiment squadrons of the R. Auxiliary A.F. are doing an excellent job. There is no doubt, too, that there is still more scope for the imaginative use of reserve personnel in administrative and support duties on the ground. Nevertheless, unless Auxiliary flying squadrons with unit pride and local loyalties can be formed, R.A.F. reserves will remain inadequate because it will be impossible fully to catch the imagination and enlist the support of the civil community.

In the Battle of Britain a third of the pilots were Auxiliaries. It could not have been won without them. Nowadays the complexity of modern weapons puts an even greater premium on the importance of trained manpower. Forty years ago there was a period of phoney war in which to prepare. We now have a period of phoney peace in which to take all measures necessary in order to prevent war, and one of the most obviously worthwhile and cost-effective is to reconstitute substantial trained reserves for the R.A.F.

Dear Sir...

Letters and photos of general interest are welcome and will be considered for publication—but they should be kept as short as possible. Will readers requiring acknowledgment of their letters please enclose a stamped addressed envelope.

Joint-Service air power

Dr. Henderson (August issue) has not altogether absorbed the point I made in July. What our military planners need to do is to think defence-wise, not separately, of the requirements of the three Services.

Dr. Henderson believes that Air Chief Marshal Smallwood asks for an overall increase in air power, and that this includes (for example) a greater budget allocation to the Army's air arm. Did the Air Marshal really mean this? And will he make his peace with the shade of Lord Trenchard?

Let us consider, however, the Army Air Corps position in the light of this (to me very strange) concept. Air power, so it seems, would receive an increased allocation of funds and a proportionate share of this would reach the Army Air Corps, which would thus obtain more helicopters for control of artillery fire and anti-tank activity. Very nice too, but not very meaningful until the Army received similar reinforcement in other fields—guns and tanks, for example.

As I see it, the Army Air Corps' budget, like those of the Fleet Air Arm and Royal Air Force, should stem initially from agreed defence priorities,

starting perhaps with an *agreed* view as to whether resistance to Russian armour and other forms of land attack will be more, or less, urgent and effective than nuclear counterblows of practical weight and distribution over an enormous target. This having been *agreed*, our preparation for the anti-tank battle (for example) has to be planned and the place of the Army helicopter determined.

Such considerations, not any overall decision about "air power" allocations, should determine the future of (in this example) integral Army aviation. Similar, and of course far wider, thinking and *agreement* should govern all other essentials—nuclear blows, naval operations, artillery, tanks, air support of fleets and armies, protection of bases and so on.

These matters need to be planned and *agreed* by men with origins in all Services but with the real ability to think as joint-Servicemen. A smattering of historians would do no harm.

This ability to think "jointly" will not be helped, I fear, by pressure groups pressing for their own particular commodity.—*Brigadier P. W. Mead, C.B.E., London S.E.3.*

Meteor's speed

The article "Gloster Meteors in action" (July issue) made interesting reading but it contains one major inaccuracy according to my memory and log-book.

On 26th August 1944 I flew a combat assessment on one of Andrew McDowell's Meteors ("YQ:1" of No. 616 Squadron) for comparison with the Tempest V. I found the Meteor cumbersome and generally unsuitable for the hot shooting war of 1944 in Europe, but it did have one interesting feature—it was about 80 m.p.h. faster

than the best propeller fighter of the period.

My log-book records that the Meteor achieved a maximum speed of 485 m.p.h. at 1,000 ft., but at that point a fuel crisis had arrived and I had to hurry back to Manston!

I have described these events in more detail in *Testing Years* to be published by Ian Allan in September, but I think the "385 m.p.h. at sea-level" quoted in the article must have been a misprint for 485 m.p.h.—*W/Cdr. R. P. Beamont, C.B.E., D.S.O., D.F.C., D.L., F.R.Ae.S., Samlesbury, Lancs.*

Short Sandringhams

I am sure that John Stroud ("Air Affairs", June issue) will be pleased to hear that both Antilles Air Boats Short Sandringham flying-boats are still in existence and, provided that the money can be raised, both aircraft should finish their days in Europe.

Both aircraft are currently stored in a hangar at San Juan, Puerto Rico, and were seen there at the end of March this year. The aircraft for which a bid has been made by the "Save the Sandringham" company (MM Aviation, Blandford, Dorset)—"Southern Cross", N158C—is being worked on slowly, but is suffering from some corrosion.

The second aircraft—"Excalibur VIII", N158J—was far more advanced in its restoration in March and has reportedly been paid for in full. If the work progresses as was hoped for at the time of my visit, the aircraft should be flown over to Europe by the end of the summer. It will then probably be preserved in either Jersey, Channel Isles, or Marseilles, France.

I can only echo John Stroud's plea that N158C return to Britain. Unfortunately, a considerable amount of work and money are still needed before any flight to Britain by this aircraft can be contemplated.—*Peter J. Marson, London, S.E. 19.*

TAM of Brazil

Further to your note about a Brazilian airline called TAR in the July issue, page 249, I should like to point out that the correct name of the company is TAM—Transportes Aéreos Regionais Marília. One of the owners of this company is VASP, the Brazilian domestic operator.

TAM is based at São Paulo, not Rio de Janeiro, and serves all the important cities of the State of São Paulo, some cities of the State of Mato Grosso, some cities of the State of Paraná, Pocos de Caldas in the State of Minas Gerais, and Rio de Janeiro.

TAM ordered three Fokker F.27 Friendship Mk. 600s and has already received two, PT-LAF (c/n. 10177) in March and PT-LAG in June; the next one was due in July. The first two aircraft replaced Embraer Bandeirantes on principal routes like São Paulo—

Seen at R.N.A.S. Lee-on-Solent's Air Day on 19th July, Westland Sea King HAS.2 XV647 of No. 820 Squadron bears the fin code "N", indicating that this unit will shortly embark in H.M.S. "Invincible". No. 800 Squadron's Sea Harriers have also been seen with "N" codes (Photo: R. A. Walker)





The Air-Britain International Fly-In held at Old Warden on 13th July attracted 71 aircraft of 51 different types including 21 machines from Scandinavia. Among the Danish visitors were: (top left) Piper PA-12 Super Cruiser OY-AVU; (right) S.A.I. KZ IIT OY-FAK, owned by Simon Moos and one of five surviving members of this type; (bottom left) Cessna 140 OY-AVO, c/n. 9032, owned by Elihard Kokholm; and (right) Aerona 11AC Chief OY-RPE, owned by V. A. Nielsen (Photos: J. M. G. Gradidge)

Ribeirão Preto—São José do Rio Preto, São Paulo—Bauru—Marília—Presidente Prudente and some cities in the State of Mato Grosso.—*Lineu Carneiro Saraiva, London S.E. 19.*

Regional airports

As someone who lives near Leeds-Bradford (Yeadon) Airport, I was very interested in Peter Martin's letter on regional airports (July issue, page 271).

Although I agree partly with his views on London and its monopolistic airports, I cannot believe that Mr. Martin seriously thinks that airports such as Bristol, Leeds, Liverpool and Tees-side can offer major threats to the continued expansion of facilities at Manchester, Glasgow and, to a lesser extent, Birmingham.

For the survival of not only passenger but business links in the regions to the Continent and within the U.K. itself, it would be totally unwise to believe that we can centre these on a few large airports. Of course, places such as Manchester do deserve large, long-term investment if they are to continue to offer the public the facilities they demand and deserve, but to do this at the expense of the smaller regionals is a dangerous path to follow.

Leisure and holiday traffic is increasing from the regionals; Leeds-Bradford in particular has seen an expansion in flights by both Britannia and newly arrived Air Europe. With a catchment area of some 6 million potential passengers, must we expect them all to have to travel to Manchester or Birmingham to join their holiday flights?

This would be both wasteful in time and resources. Statistics prove that more and more people prefer to fly from their "local".

With regard to Mr. Martin's last point, stating that he sees "one or two airlines trying to establish themselves as major European carriers"—well, why shouldn't they? Presumably they know what they are doing and what they want to be doing in ten years' time! They will either fail or continue to operate ever-popular, ever-expanding profitable flights from Britain's regional airports; but they will of course only achieve this with both Government and passenger support. Which of course takes us back to the foundations of the argument: do we, as Mr. Martin unwisely suggests, develop just one or two large airports, or do we support a network of small, comprehensive regionals?—*Michael J. Howard, Leeds, Yorkshire.*

Airspeed Horsa

My last two published novels dealt with W.W.II flying combat and featured the Typhoon (Hamish Hamilton and Eyre Methuen). My projected third will deal with the Horsa glider and its use by airborne forces. Perhaps I should add that as a wartime R.A.F. pilot I transferred to military gliders with the Glider Pilot Regiment and flew Horsas.

I am anxious to trace the whereabouts of any Horsa that may still exist and also a copy of any Pilot's Notes—although I was never aware of any issued when I did my Heavy Glider Conversion Course. The cockpit layout

and controls have gone from me over the intervening years and a knowledge of these is, of course, essential for my novel. The main technical details are easily accessible in reference books, but there is a uniform silence on the Horsa's control while falling like an aerodynamic brick.

Can any reader help?—*John Rossiter, 2 Church Close, Orcheston, near Salisbury, Wilts. SP3 4RP.*

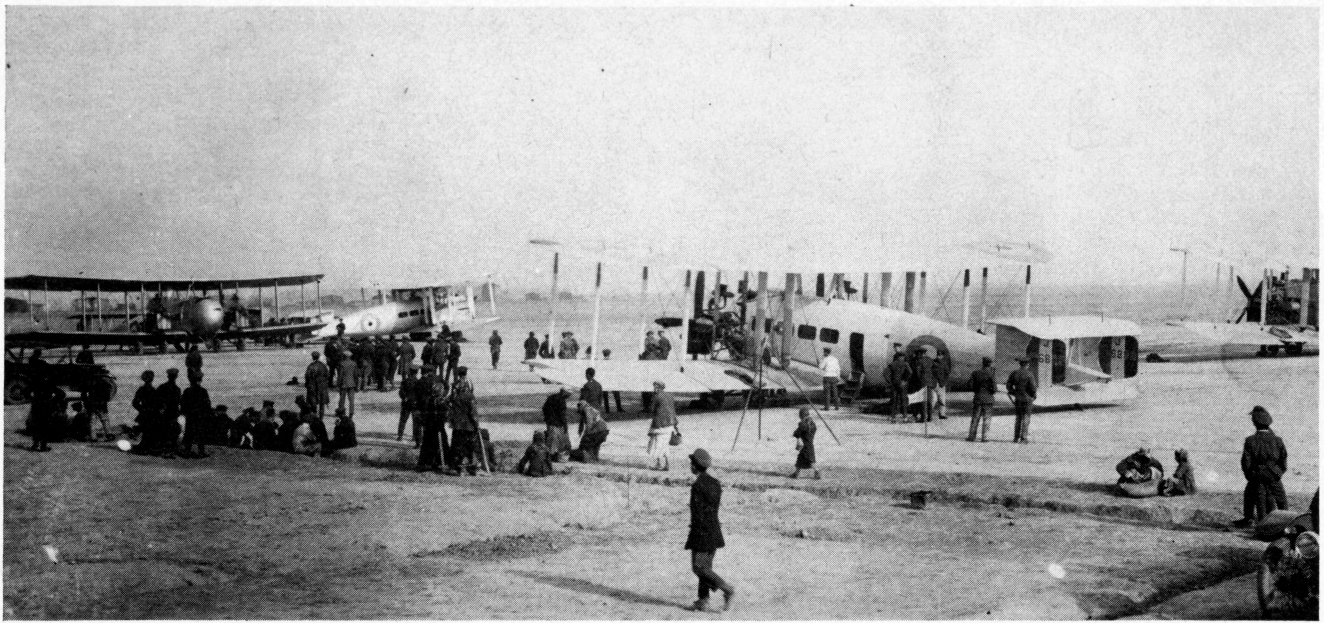
No. 208 Squadron reunion

The "Naval Eight"/No. 208 Squadron Association is to hold its Annual Reunion Dinner at the R.A.F. Club, 128 Piccadilly, London WU1 0PY, on Saturday, 25th October—64 years after the formation of No. 8 Squadron, R.N.A.S. As always, the dinner is open to former members of the squadron of all ranks and will start at 6.30 p.m. for 7.30 p.m. Dress is lounge suits.

Any person wishing to attend should contact the Association's Hon. Treasurer, W/Cdr. R. J. White, M.B.J.M., R.A.F., O.C. P.M.S., R.A.F. Lyneham, Chippenham, Wiltshire SN15 4PZ.

V-bomber book

I am writing a book about the V-bombers and am anxious to acquire documents, photographs and memories of anyone who has been involved with any or all aircraft. My book is intended not only to cover the aircraft but the political/military influences that have influenced their operational role—*N. M. Lee-Frampton, "Rosefire", 3 Church Hill Cottages, Tuddenham, Ipswich, Suffolk.*



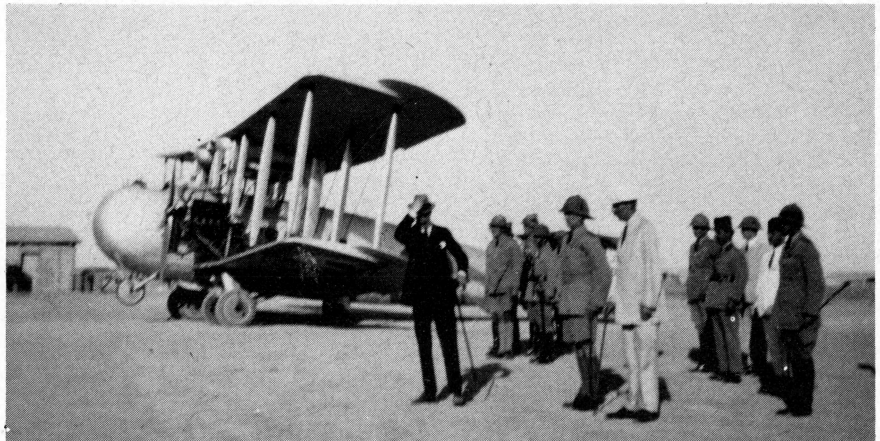
Hinaidi Highway 1924

Photos: Skyfame Collection Text: Bruce Robertson

A busy scene in 1924 as Vickers Vernon J6889 (foreground) of No. 70 Squadron prepares to leave for Egypt with the mail. Early Vernons had Rolls-Royce Eagle engines, proved underpowered and were soon re-engined (as here) with Napier Lion IIs

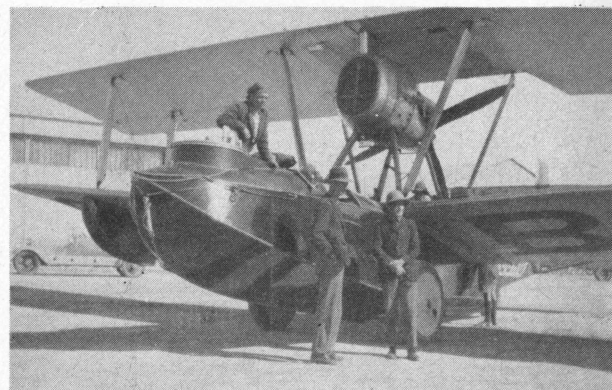
ON 1ST OCTOBER 1922 the R.A.F. assumed responsibility for policing Iraq under League of Nations mandate. The use of aircraft for this task was in the nature of an experiment but soon proved swifter, more effective and cheaper than conventional infantry operations, thanks in some measure to the open nature of the terrain.

Within two years a chain of airfields had been established and Baghdad aerodrome, later known as Hinaidi, became an important stage in pioneer flights to the East. These pictures show some of the air traffic in 1924 at Baghdad (Hinaidi), which was also the Aircraft Depot for Iraq Command and housed four D.H.9A squadrons (Nos. 8, 30, 45 and 55) and the Vernons of No. 70 Squadron, as well as armoured car companies.

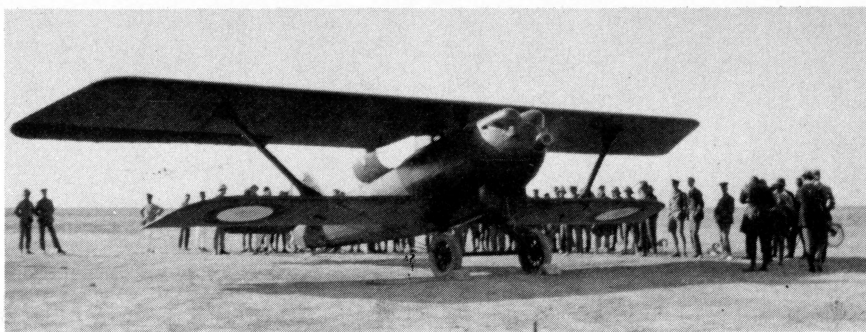


Above: A 1924 VIP flight at Baghdad. The picture shows the arrival from Egypt of Lord Thomson, Secretary of State for Air, in a Vernon; note aircraft's nose wheel

Below: In a bid to make the first round-the-world flight, S/Ldr. A.S.C. MacLaren, with F/O. N. Plenderleith navigating and Sgt. R. Andrews as engineer, set out from R.A.F. Calshot on 25th March 1924. Their Vickers Vulture amphibian, G-EBHO, c/n. 2, is seen (Left) staging through Baghdad, with a close-up of the crew (Right). Unfortunately the Vulture crashed on take-off at Akyab, Burma, and a replacement aircraft—the only other Vulture built, G-EBGO, c/n. 1—crashed while they were attempting to cross the Bering Sea



Lt. Pelletier d'Oisy of the French Air Service made a Paris-Tokyo flight with the minimum of preparation in Breguet XIX No. 63. He is seen at Baghdad two days after leaving Paris on 26th April 1924. The Breguet XIX, which first flew in May 1922, was one of the most successful inter-war types, well over a 1,000 being built, and some in service with the R. Hellenic A.F. fought against the Italians in World War II



The very same day as d'Oisy arrived, Captain Antonia Paes, Lt. Sarmento de Beires and Sous-Lt. M. Gouveria, flying modified Breguet 14A2 biplanes of the Portuguese Army, staged through Baghdad on their flight from Lisbon to Macau. Predecessor of the XIX, the Breguet 14 entered French A.F. service in 1917 and had a notable career in W.W.I, on bombing and reconnaissance duties. The type remained in production until 1921, by which time more than 8,000 had been built

More frequent visitors to Baghdad, however, were the standard Breguet 14s of the French Air Service, employed on mail-carrying and exchange flights from Aleppo (Haleb) where the French held mandate responsibilities in Syria. As indicated above, the Breguet 14 operated with great reliability for many years, the last French A.F. examples remaining in service until 1930



On 31st July 1924 Major Pedro Zanni and his mechanic Beltrame of the Argentine Army Air Corps reached Baghdad in this Napier Lion-powered Fokker C IV, named "Ciudad de Buenos Aires", having set out from Amsterdam on a flight to Tokyo. A set of floats was provided for the machine so that the undercarriage could be switched for the final over-water sector. The Fokker C IV first appeared in 1923 and 139 were built in Holland

There was even a home-built making its first flight at Baghdad in 1924, on 10th June. This was the England glider which crashed during trials, but its designer, S/Ldr. Tom H. England, D.S.C., A.F.C., received his reward the next year when he was appointed to the command of No. 22 Squadron, then the R.A.F.'s experimental aircraft squadron, based at Martlesham Heath



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Kit News

by J. D. R. RAWLINGS

Revell's 1980 production

WHILE OTHER kit manufacturers appear to be cutting down their rate of issuing new kits Revell continue to re-issue, re-vamp and send out brand-new productions.

With the current dearth of new World War I kits it is good to see that two of the Revell range have reappeared. The Fokker D VII, in 1/72nd scale, is unchanged in form and contains transfers for one version. The Sopwith Triplane, also in 1/72nd scale, is one of the more pleasingly accurate of the Revell range and comes with two alternative tailplanes, the larger one for the prototype and smaller for the production machines. This was done last time the kit was issued, when it had transfers for three versions, but the reissue has only transfers for the prototype. Both kits assemble easily and are good representations of the real machines.

One of the advantages of an aeroplane like the F-4 Phantom II is that it appears in many different versions and this enables the kit manufacturers to re-vamp their successful kits anew. So we see the venerable, but nonetheless good, 1/32nd-scale Revell Phantom, which has appeared in many guises already, now come on the market suitably equipped as a U.S. Navy F-4J of the U.S.S. *Constellation's* VF-96 Squadron. This is still a good and accurate kit in this scale.

For World War II enthusiasts the company has produced, again in 1/32nd scale, the North American P-51B Mustang in the form with the blown "Malcolm" hood. It is a simple kit for this scale with fewer than sixty parts of which nine go to form a realistic engine and airscrew. These parts are nicely moulded and one would welcome painting instructions as the model can be completed with the engine showing. Cockpit details, too, are good with separate panels for port and starboard walls, with all the controls moulded accurately, a good instrument panel and rudder pedals recessed. Fuselage halves and wing and empennage

halves are accurate in outline and have a multiplicity of rivet lines on them—possibly a little too prominent.

The major components of the Mustang fit well and the wings have the dihedral angle built into the lower wings, giving a realistic sit. The undercarriage legs are well detailed, fitting positively into well detailed wheel wells. The canopy also fits well and can be mounted in the open or closed positions. An adequate transfer sheet gives markings for "U've had it!" of the 357th Fighter Group, U.S. 8th A.F. based at Leiston in 1945, or the aircraft flown by W/Cdr. H. A. C. Bird-Wilson when he commanded a Mustang Wing of 2nd TAF also in 1945.

Other reviewers have said that this is the year of the Hornet and Revell certainly seem to think so. In the June issue we reviewed their 1/48th-scale model of the F-18A Hornet and now they have gone one bigger with the same aircraft in 1/32nd. This is a deluxe offering, with tinted canopy and "rubber" tyres for the wheels and the whole model has been redesigned, the fuselage front being divided vertically and the rear horizontally, making for easier assembly in this scale. Panel lining is delicately done and everything is there to make a fine representation of this new fighter. Transfers, again, are for a VF-11 aircraft from *Forrestal*.

The other new-generation U.S. fighter of the early 1980s is the General Dynamics F-16 and Revell have now issued a kit of this in 1/48th scale. With sixty parts it provides for a reasonably detailed representation of the F-16A single-seater. Transfers provide for the instrument panel and side consoles in this model and the side controller for the pilot is accurately reproduced. The "difficult" air intake is formed from four parts to get the shape and detailing correct—it repays careful assembly. Sturdy undercarriage members make for a good "understanding" and the wing shape is easily obtained as the upper surfaces are moulded in one piece with the upper fuselage, thus making for easy assembly. The whole is moulded in light grey plastic and camouflage colours are shown on the instruction sheets to make a U.S.A.F., Danish or Norwegian aircraft for which an adequate transfer sheet is provided.



Revell's 1/32nd-scale McDonnell Douglas F-4J Phantom represents an aircraft of VF-96 Squadron serving in the U.S.S. "Constellation"



Avro Anson I general reconnaissance aircraft of No. 217 Squadron before the war. When W.W.II started the R.A.F. had 760 Ansons on charge

Years of Preparation

Working with Avro's at Manchester before Munich

by **HERBERT A. METTAM, M.A., C.Eng., F.R.Ae.S.**

FOR THE aircraft industry the period before the start of World War II, on 3rd September 1939, was a time of great pressure and many innovations. Cantilever monoplanes replaced biplanes, fabric gave place to metal for the covering of wings, fuselages and control surfaces, and the armament of single-seat fighters increased out of all recognition.

During this period I had the great good fortune to be employed as an Assistant Designer with A. V. Roe & Co. Ltd. at their works at Newton Heath in Manchester. I was therefore able to play a very small part in the design of the Avro Manchester bomber, which became the forerunner of many much more famous aircraft. I was also in on the ground floor, so to speak, of the start of that world-famous combine, Hawker Siddeley Aircraft.

Indeed, I could claim more than usual interest in this matter as I had worked for Hawker's before they were well known and I owed my Avro post to Sir John Siddeley himself. When I joined Roe's in February 1935, Sir John controlled that company as well as the twin Coventry firms, Armstrong Siddeley Motors and Armstrong Whitworth Aircraft. Hawker Aircraft at Kingston-on-Thames controlled Gloster Aircraft at Hucclecote, Gloucestershire.

While Avro's were still under the guidance of their founder, A. V. (later

Sir Alliott) Roe, the design office, under Roy Chadwick, was at Hamble on the Solent, and the workshops were at various sites in Manchester. When Sir John Siddeley took control he moved the design office to the works at Newton Heath, and transferred a Scot named Cameron from Armstrong Whitworth as Assistant Designer.

Chadwick had long had as his senior assistants, Jim Turner, Chief Draughtsman, and Harold Rogerson, Chief Technician. I became the second Assistant Designer and the third was Stuart D. Davies, who was later to succeed Chadwick as Chief Designer.

A tribute to Jim Turner came from one of the old hands who had served at Hamble in some such words as these: "It is a pity that Jim has to spend his time doing administration as he used to be a first-class designer in his own right." John Cuss, one time of Gloster Aircraft, has supplied this comment on Harold Rogerson: "The leader of the stressing team was H. Rogerson, a delightful chief who called everyone 'Squire'. He had suffered the loss of his right arm in the first World War, but gave himself unstintingly to working for the company and made light of his disability."

I must add that I received much helpful kindness from them both, and that Chadwick's task would have been much more difficult without them. Does

anybody else remember that Rogerson applied his long experience with air-screws to the design of the ventilating fans for the Mersey Tunnel?

There was an increasing number of very competent section leaders and it was to them that portions of work were allocated. Apart from small cores of draughtsmen who remained with the same leader, the others were moved from section to section as the work load varied. Except for an office for Chadwick and smaller ones for the seniors mentioned, all the rest of us were in a large office lit by skylights. The absence of windows in the walls did not really matter as we were surrounded by a smoky industrial area.

Chadwick

Roy Chadwick's career as an aircraft designer started before World War I began and continued till after W.W.II ended. This is not the place—nor am I the person—to attempt any appraisal of the value of his work to the nation. He would doubtless have qualified for a Knighthood if he had not died, in 1947, when the prototype Tudor II took off with the flying controls wrongly assembled. It was indeed an irony of fate that this should happen to the man under whose guidance the control system of the Manchester was so carefully designed to reduce such risks to the minimum.

At some stage in the early years at Hamble, Chadwick started to learn to fly. Rumour had it that he even received some instruction from the immortal



Roy Chadwick, Avro's Chief Designer until his death in the Tudor II accident in 1947

Years of preparation . . .

Smith Barry at Gosport. Anyway, that venture ended in a near fatal crash, which left him with silver plates in his skull and probably elsewhere. Admiration for his achievements is enhanced by knowing about the after effects of his injuries which were liable to include blinding headaches.

During the years that I worked for him Chadwick must have been heavily involved with policy and planning, and responsibility for detail design was delegated to the section leaders and seniors, as described previously. Looking back I suspect that he actually found it a relaxation to emerge from his office and demand to know what some draughtsman, apparently selected at random, was doing and why. Particularly and why? Those chosen were often terrified by such a visitation and the section leader or other senior concerned had to come up in support as quickly as possible!

Chadwick had an uncanny knack of being able to sit and look at some large drawing for some moments and then put his finger on some point which would very likely prove to be the only error in a mass of detail. If he changed something he would often tell the

draughtsman to "do it that way even if Mr. Cameron or Mr. Mettam or the Archangel Gabriel tells you something different."

Chadwick often told me off—in his office which I accepted as probably well deserved—or at a draughtsman's board which I felt was really a bit hard. After the latter sort of occasion, however, he was quite likely to come to my office and offer me a lift home! We did happen to live in adjacent suburbs but even so he had to drive several miles more than his normal route. In fact he was, as he once described himself, "a kind-hearted fellow at bottom." Anyway we always got on very well together whenever we met after I had left.

Biplanes and autogyros

During their long history the Avro organisation designed and built many different types and experimented with diverse forms of construction. Suffice to mention here that they followed up the legendary 504K with other single-engined biplanes for civil flying and for flying training. The latest versions of these were being produced at Newton Heath when work started on the Manchester.

The custom of fitting autogyro rotor systems on Avro fuselages started soon after the Spanish inventor, Senor Juan de la Cierva, came to England. This culminated in a decision to build a production batch of C.30A autogyros at Newton Heath, and to adapt some of them for use by the Royal Air Force under the service name of Rota. I was engaged to take charge, under Chadwick, of the necessary drawing office work and to look forward to further developments. Soon after the Hawker Siddeley board took control the policy was modified, and I was very happy to be transferred to work on the Manchester.

Fokker connection

It was presumably Sir John Siddeley, when he took over control from the founder, who arranged for Avro's to build high-wing cantilever monoplanes under licence from Fokker. Apart from the sales of such aircraft, there were two important legacies from this connection. One was welded-steel tube construction for fuselages, which was adopted as standard for the biplanes already mentioned. The other was the straight-through wooden construction plywood-covered cantilever wing, on which Chadwick built up the Anson. This twin-engined low-wing cantilever monoplane had a success before, during and after W.W.II comparable to that of the 504 variants of the W.W.I era. The Anson has been called the "work horse" of the R.A.F. and was given the affectionate nickname of "Faithful Annie".

Defensive armament of the Anson was never a strong point, even in its

original general reconnaissance version as used by R.A.F. Coastal Command at the beginning of the war, and I remember Chadwick telling, with sadistic glee, of an Anson which was attacked while flying over the sea. As the Heinkel He 115 seaplane began to catch up, the Anson descended to a low level and did a sharp banked turn. The enemy tried to follow and went straight down into the water. Clearly a case of "Annie needs no gun".

As soon as the name "Manchester" was adopted for our next product, the old hands who had been at Hamble during W.W.I told the newcomers that they had built two small twin-engined bombers during that period. One had also been called "Manchester" and the other "Pike". On one occasion the prototype Pike took off in a dangerously tail-heavy condition and was saved from disaster by the courage and agility of the young man in the rear cockpit, which was just behind the pilot. Somehow he managed to climb out of that cockpit, scramble along the top of the fuselage and so into the empty cockpit in the nose. His name was R. H. Dobson.

"Dobbie"

The man who later became Sir Roy Hardy Dobson was always called "Dobbie". He and Chadwick had worked together as Works Manager and Chief Designer for many years before I met either of them. I often wondered how two such forceful characters were able to run amicably in double harness, but to all appearances they did. And they continued to do so after Dobbie became General Manager under the Hawker Siddeley board.

On the workshops side he was supported by a number of highly competent foremen whom I imagine he drove as hard as he drove himself. Teddy Fielding became Works Manager when Dobbie was promoted, Sandy Jack was the Chief Inspector and Jack Green was another leading spirit, sadly handicapped by deafness.

I seldom saw Dobbie and got very little chance to know the others. The senior staff from the workshops and those from the drawing office lunched at different times, and only met socially at tea when working overtime.

To these names I will add only those of the three men who were detailed to advise the drawing office on designing for ease of manufacture. First Roland Taylor, and later George Oldham and Dick Wild as well, used to come round to the drawing office and discuss our schemes before they were completed and issued. I presume that all firms adopted something of the same kind, but my impression was that the Avro version worked very well.

Another contribution to the future made by Dobbie and his men was prowling round other firms to discover which of their methods and resources could be brought in to help. Again my

Sir Roy Dobson, who was Works Manager



impression is that friendly arrangements of this sort could become effective more quickly and readily than the Shadow Factories. Dobbie's personal friendship with Sir George Bailey of Metrovick was an example.

"Productionising" the Manchester

The Manchester was a large monoplane bomber with two Rolls-Royce Vulture engines. A considerable number, around 200, Manchesters were built but the engines were never really satisfactory. The type was replaced by the world-famous Lancaster with four Rolls-Royce Merlin engines. I understand that many parts of the Manchester were used, with little or no alteration, for the much more numerous Lancasters.

A. V. Roe had long been used to designing relatively small aeroplanes for cheap production for the civil as well as the military market. With war looming on the horizon, it became more important to aim at speed of manufacture rather than cheapness. It was also possible to use, from the prototypes onward, methods which would have been far too costly for small numbers only.

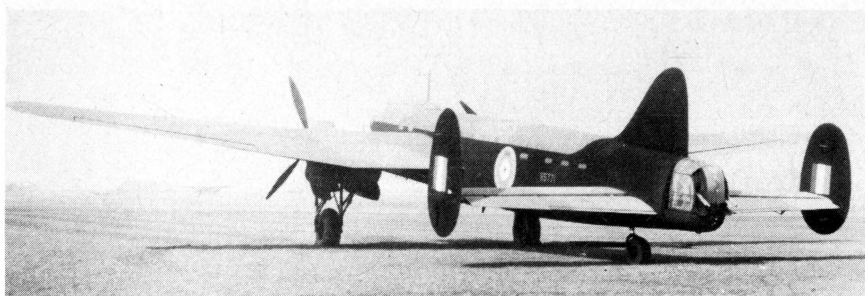
I can only quote two examples that particularly impressed themselves on my memory. The booms for the spars for the Manchester's outer wings were made from large duralumin extrusions cut diagonally so as to form two tapering booms which then had to be machined to leave the amount of metal required for strength as the load got less towards the wing tip. I have no idea who thought of the scheme but I am sure that the cost of the tools must have been very high.

A second example was the use of really large stampings, one on each side, joined on the centre-line, for the attachment of the wings to the fuselage. There was quite a furore when the specialist firm decided that it was absurd to change the die for such a small number and sent eight for one side instead of four of each. Maximum use was naturally made of stampings and extrusions and such like devices.

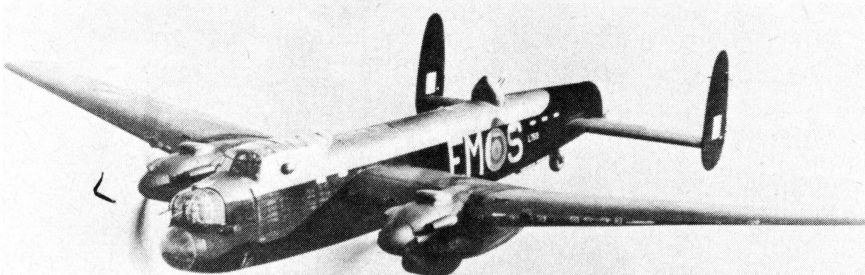
The effort put into this aspect of the Manchester paid handsome dividends when the Lancasters had to be produced during the war years. All good Avro men—and at least one Avro old boy—continue to believe that the Lancaster production times were better than those for any comparable aircraft!

Conditions of service

It may be of interest to describe our conditions of service, which were presumably typical of those then prevailing in the Industrial North. Apart from Sundays and Bank Holidays, the only holiday we got was the week including the August Bank Holiday (then the first Monday) and either the week before or the week after. I well remember Cameron telling me that he had never even



A Manchester I, R5771, built by Metropolitan-Vickers, with the original small endplate fins and central fin added for stability (Photo: Harry Holmes)



Stability was further improved in the Manchester IA (L7515 of No. 207 Squadron illus.) by increasing outer fin area and tailplane span; the central fin was then deleted. Nothing much could be done about the erratic Rolls-Royce Vulture engines, however



Above: Except redesigning the aircraft to take four Rolls-Royce Merlins and thus producing the war-winning Lancaster. A "Lanc" is seen under test at Yeoman

Below: Lancasters being built at Chadderton. Total production was 7,366



Years of preparation . . .

asked for any extra leave except for illness—in eight years of service.

Concessions were given grudgingly, even for specifically aeronautical occasions such as the R.A.F. Display at Hendon on a Saturday or for a sort of one-day S.B.A.C. show on the following Monday. I remember how surprised Mr. (later Sir Sydney) Camm of Hawker's was when I told him that I was attending the Royal Aeronautical Society's Garden Party on a Sunday at my own expense and entirely in my own time. Incidentally that may well have been the occasion when he described the aviation industry as being made up of three parts: "Design, production and wrinkle-smoothing—and the greatest of the three is wrinkle-smoothing."

I should have mentioned that we did get Saturday afternoons free. When the pressure really began to build up, we were required to work overtime till 7.30 p.m. three evenings a week. At first this applied every week but the draughtsmen's union did manage to get this reduced to three out of four. I remember telling a visitor that this overtime meant being away from my home for 13½ hours and got the reply—"It's a living death of course—a living death."

Senior staff naturally did not get paid for overtime, but I think our high tea was provided free. This included such local specialities as cold tripe or egg on haddock. Incidentally, the senior staff mess was equipped with a ping pong table and a dart board. We got quite a bit of fun out of these at lunchtime as well as at teatime.

The 13½ hours mentioned earlier arose because I chose to live on the

south-west side of the city while working on the north-east. That involved travelling by train and by bus but there were no strikes affecting either in my four years' residence.

Hawker Siddeley influence

I really knew very little about Hawker Siddeley's influence on our firm at the time but I gathered that the two directors from London who took most interest in affairs in Manchester were Mr. T. O. M. (now Sir Thomas) Sopwith, and Mr. F. S. (later Sir Frank) Spriggs. With hindsight I detect a Spriggs influence in the foresighted tooling up for the Manchester. I learned much later that he had made provision, well in advance of any official authority, for the production of the Hurricanes which played such a crucial role in the Battle of Britain.

I liked the story of the top-level meeting at which Fielding, Works Manager, said that he could produce the Manchesters if the Drawing Office were stopped from making modifications. To which Spriggs was reputed to have replied, "You know perfectly well that the drawing office will have to go on making modifications right up to the last production batch and you will have to adjust your plans to suit."

Before starting on the Manchester, the only experience of stressed-skin construction that A. V. Roe's had had was with the two prototype Avocets in 1926. Gloster Aircraft were therefore asked to loan a senior stressman knowledgeable in this subject. The volunteer was John Cuss who came for six months and stayed for sixteen. He was able to point the way to substantial weight savings, and was very disappointed that Chadwick would not

accept recommendations for more. So were the locals, but the resultant reserves of strength were very useful for the Lancasters.

Two further developments were the posting of a group of Gloster draughtsmen to Newton Heath to prepare some of the many drawings required for the Manchester and of a group of Avro draughtsmen to Kingston to prepare production drawings for the Hawker Hotspur. The prototype Hotspurs had been designed and built by Hawker's but the Hawker Siddeley board decided that any production required should be placed at Newton Heath. When the Avro section leader in charge of the group threw his hand in, I got the job and took over at very short notice. Camm was very helpful to us and clearly disapproved of the lack of co-operation shown by some Hawker people while he was on sick leave. Aided by the resulting spirit of rivalry, and weekly visits by Dick Wild, we did the job in good time. However, the Hotspur's quality was never tested as the production orders went to the Boulton Paul Defiant.

Lighter side

My wife and I and our three children lived very happily in Bowdon in Cheshire. Our five-bedroom semi-detached house only cost £65 per year. Our neighbours soon showed the usual North Country friendliness and helpfulness. So also did my colleagues at the works—once they had got over an initial illusion that Bowdon was a millionaires' paradise! We much appreciated being near to the amenities of the City of Manchester, ranging from excellent shops to Cochrane premieres, and having ready access on Sundays to the Peak District and to the North Wales coast resorts.

I was lucky enough to meet the Manchester representative for Shell, H. B. Eyles, who offered to propose me for membership of the Rotary Club of Manchester. Neither Dobson nor Chadwick wanted to belong, so I became the representative of the aviation industry—Fairey's at Heaton Chapel were not consulted! I was out of my class financially as most of the others were heads of businesses. However, I got a lot of pleasure out of it.

Farewell to the industry

I left the Civil Service as a Junior Technical Officer on £300 p.a. (more than I got from Hawker's three years and an Honours degree later) and returned as a Senior Technical Officer on £680 p.a. nineteen years later. I hope that these reminiscences have given some idea of the interest and variety that kept so many people of diverse backgrounds going through those lean years. In modern phraseology, it may be said that the aircraft industry, between the wars, offered not so much a career as a way of life.

Sole surviving Avro Tutor in Britain is G-AHSA (ex-K3215) which is owned by the Shuttleworth Trust who restored it to airworthy condition and repainted it in pre-war yellow training colours, with its original serial (Photo: Air Portraits)



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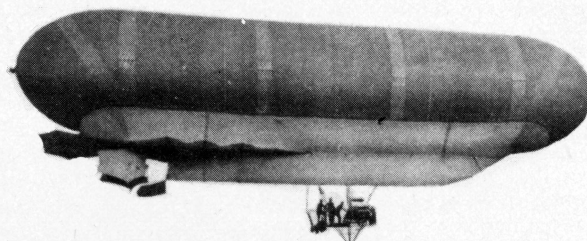
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Aviation Bookshelf

The Soviet War Machine

Consultant: Air Vice-Marshal Stewart Menaul (Salamander, £7.95)

The jacket of this book, which is an updated revision of the 1976 edition, bears the additional title "The illustrated encyclopedia of the strategy, tactics and weapons of the Soviet War Machine", and adds the chilling statement: "with their planned overkill the Russians could destroy the whole of human life probably ten or twenty times over". Inside it is profusely illustrated, with many excellent and coloured photographs of all the great variety of Russian aircraft, ships, tanks, rockets, and military weapons and includes some of the best detailed descriptions yet published of such recent items as the new 38,000-ton "Kiev"-class aircraft-carriers; the 9,300-ton "Delta"-class nuclear missile-armed submarines, the biggest submersibles yet built; the MiG-25 fighter, about which a great deal more is now known since the defection of a Russian pilot in one of them to Japan; and the vast numbers of formidable battle tanks such as the T-72. The text is sufficiently up-to-date to include references to the invasion of Afghanistan.

The book is divided into a number of sections, each by its own specialist contributor. One deals with the rise of Communism; another with the initial expansion of the Red Army; and a third with the organisation of the Soviet Armed Forces. From these a fourth section derives important and logical conclusions about Soviet global strategy in both peace and war. This latter section is of special interest, because it offers to the student of Russian affairs the groundwork and the means of interpreting many actions and aspects

of Soviet military might which are otherwise completely baffling, and inexplicable.

A unique diagram on page 42, headed "The Soviet Perception of the World", makes clear the probable reasons for the enormous expansion of the Russian Navy in recent years, to the point where it is able to challenge even the U.S. Navy in waters of particular interest to Russia. It becomes clear that the Indian Ocean is a theatre which Russia has decided to make her own; and my own further interpretation of the facts presented is that the invasion of Afghanistan is but a preliminary move in the long-term aim of securing a base at Karachi, from which the new Russian Navy could and would dominate the flow of oil supplies from the Middle East to the whole of the Western World, and to Japan.

Further sections describe in detail, with superb illustrations and drawings, each of the five main elements of the Soviet Armed Forces, namely the defence of Soviet airspace, the Air Forces, the Strategic Rocket Forces, the Navy, and the Ground Forces. Warsaw Pact Forces are also described, as are uniforms and badges; and the whole is completed with a good index.

As one would expect in a publication for which "Paddy" Menaul is Consultant, the whole work is very well organised and put together. At £7.95 this publication is exceptionally good value, and should be regarded as a "must" for any serious student of Russian military might and intentions. It should also be compulsory reading for any idiot who fancies that the security of Britain may be attained by one-sided disarmament and CND marches. — G.J.C.P.

Preserved Aircraft

by Peter R. March (Ian Allan, £5.95)

Mr. March is well known for his photographic and literary skills and *Preserved Aircraft* puts them together in 160 pages and hard cover. More than 250 aircraft types are dealt with from Blériot Type XI (1909) to Campbell Cougar Gyroplane (1973) by way of the Spitfire

and Concorde. Each type is illustrated, alongside the detailed history of that particular example and a brief outline of the type's development and technical aspects.

Being written by an active enthusiast, the information is accurate and detailed, the photographs large and well chosen. My only criticism is that the final sub-heading under each type, "Other preserved examples", is misleading as this relates only to some, but not all, U.K. preserved machines. — P.J.B.

British Airports

by Alan J. Wright (Ian Allan, £1.25)

This 80-page book provides the main details and histories of more than 40 airports in England, Wales, Scotland, Northern Ireland and the Channel Islands. For each of these there is also a layout plan and there are 40 photographs, some of the airports and others showing various types of aircraft seen at these airports.

A seven-page appendix gives brief details of more than 200 airfields not covered by the main section of the book. A typical example is "Barra (Hebrides) On beach at North bay. Civil. Loganair Services; air taxi operations. A/G 118.8 MHZ." — J.S.

Fighter Command

by Chaz Bowyer (Dent, £7.50)

It is difficult to determine the readership for which this relatively lightweight book is intended. By the author's admission it is not a full history of R.A.F. Fighter Command but it describes nicely enough, albeit in broad terms, the development of that prestigious unit. The book traces the origins of the Command and its subsequent growth, interspersed with personal accounts, although these are confined to the war years, as is most of the content.

Some fifty-five photographs support the text but many of these have previously appeared in other books by Mr. Bowyer. All the less excuse then to caption wrongly a Thunderbird missile as a Bloodhound! Appendices list the Command's C.-in-C.s and squadron dispositions at various dates and there is a useful bibliography.

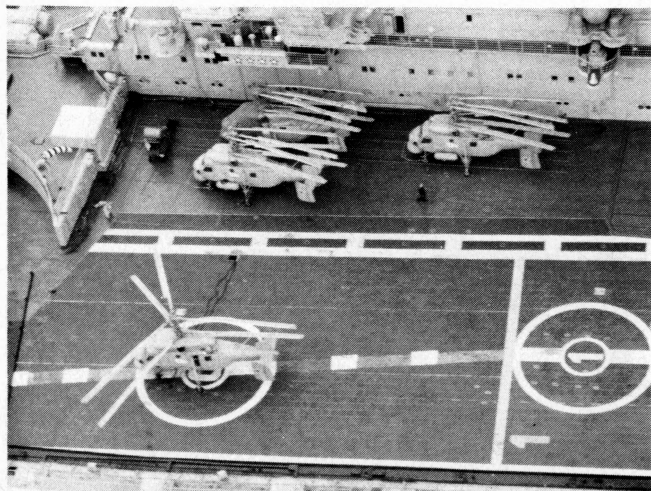
In summary, a useful enough book, if a trifle expensive, written in a flowing style generously punctuated with superfluous "inverted commas" which tended to slow down this already "slow-reading" reviewer. — V.F.

Essential Law for Pilots and their Crews

by Norman D. Price (Oyez Publishing Ltd., £10)

This is a rather specialised and high-priced 154-page paperback covering a subject which one supposes is well known to lawyers but on which little seems to be available to the layman.

(continued on page 372)



Close-up of four Kamov Ka-25 "Hormone-A" anti-submarine helicopters aboard the Soviet Navy aircraft-carrier "Kiev", taken in May this year by a Royal Navy Westland Wasp operating from the frigate H.M.S. "Dido". Note the Kamovs' contra-rotating rotor blades which make a neat pattern when folded

Your Questions Answered . . .

... by AIR-BRITAIN via its over 150 Information Specialists and Aviation Research Groups. Will readers please confine their enquiries to one specific subject, and note that information cannot be supplied separately by post. Unidentified rare photos welcomed for comment.—Ed.

Scimitar runway tests

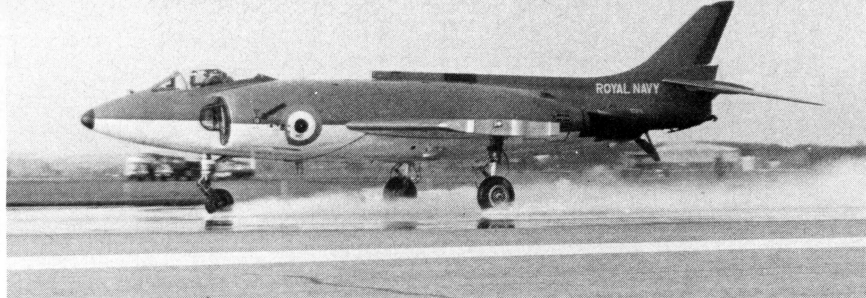
Q: Please describe the use of Scimitars for testing high-friction runways at Farnborough in the late 1960s.—Jnr. Tech. M. A. Richards, R.A.F. Kinloss, Morayshire, Scotland.

A: The tragic air crash at Munich on 6th February 1958 involving BEA Airspeed Ambassador G-ALZU carrying the Manchester United football team, coupled with increasing all-up landing/take-off weights of the then new generation of commercial and military aircraft, prompted scientists to examine the problems associated with the operation of aircraft under wet or slush-covered runway conditions.

By the mid-1960s some progress had been made in identifying aircraft behaviour patterns under adverse runway conditions, and at the R.A.E. Farnborough scientists were ready to start testing and to evaluate anti-skid braking systems on the recently resurfaced north-south runway. Here a coarse open-graded macadam friction course had been laid, and it was proposed to plot aircraft braking performances on this and other surfaces in a series of braking friction trials.

The aerodynamic vehicles employed were two Royal Navy Supermarine Scimitar F.1s. The first aircraft, XD248, arrived on direct loan on 12th May 1966 and a protracted series of modifications to the wheel and brake mechanism components was begun. Instrumentation for recording deceleration and brake pressure continuously, with a time base on photographic paper, was fitted and XD248 was ready to start trials by December 1967.

A pilot familiarisation test was conducted on 13th December under wet runway conditions. Running over grooved asphalt with standard Maxaret brakes, tyres set to 1,500 p.s.i., braking



The second Scimitar, XD219, with cropped wings at Farnborough (Photo: R.A.E.)

was applied at a speed between 60 and 80 knots, although on the following twenty-three test-runs exact braking speeds were recorded (lowest 56 kt. on test 18, 2nd March 1968 and 125 kt., the highest, on test 6, the third preliminary trial, on 22nd January).

Sixteen tests, including the last, were made on the grooved asphalt, six using coarse open-graded surfaces, and two (including the penultimate) on an ungrooved asphalt runway. All three surface conditions were at times subjected to artificially wetted test sections, and by the end of the first programme, the last run being recorded on 5th March 1968, XD248 had been fitted with modified Maxaret brakes and tyre pressures increased to 2,000 p.s.i.

On 17th April 1968 Scimitar XD248 was returned to R.N. charge and flown to A.H.U. Brawdy. The initial trials, although incomplete, had been terminated. About eight months later the second Scimitar, XD219, was received at Farnborough. This was a "time-expired" airframe and in the event proved a most useful asset for the runway surface tests trials team. As there was no requirement for airborne testing, extensive modifications were made. The most obvious of these was the cropping of the mainplanes outboard of the main undercarriage points. Nosewheel steering was fitted, high-power four-plate brakes replaced the standard three-plate assemblies and brake supply pressure was increased from 10.35 MPa to a nominal 13.8 MPa. With the outboard sections of the wings removed, lift forces were decreased, vertical load on the wheels increased, and proportionately the brake drag forces.

Thus modified, XD219 was prepared for a programme of tests which fell into three related main categories: (1) Anti-skid systems, comparing old with new systems and including Maxaret Mk. 2, 5, 6, plus Hytrol Mk. 3; during these

tests Maxaret Mk. 5 and Hytrol Mk. 3 assemblies were fitted together on plates mounted under the wings, type selection as required being made by the test pilot. (2) The evaluation of smooth and aquagrip tyres. (3) Braking performance trials on grooved asphalt and slurry seal runway surfaces.

Approximately 147 trials were completed before XD219 was involved in a spectacular high-speed crash on 9th January 1973. The accident occurred during a trial on the short runway after the aircraft had failed to engage the arrester wire and, while still travelling at well over 100 kt., ran on to the grass overrun area. With a resounding crash the nosewheel struck a concrete plinth, some 6-9 in. in height. The impact tore the nosewheel and oleo from its mountings and fractured the Scimitar's back just aft of the cockpit. Irreparably broken, the battered hulk was later removed to Shoeburyness.

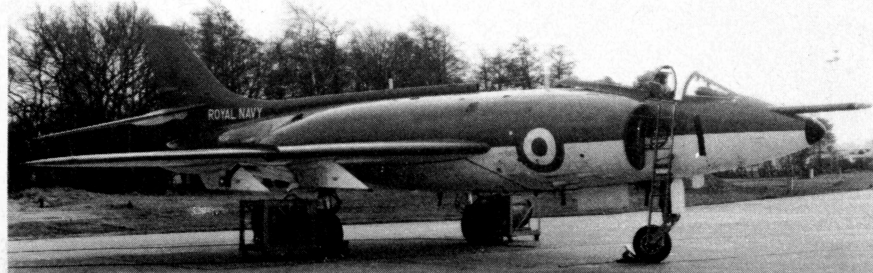
At the time of this accident tests had been made on two types of runway surface, grooved asphalt and slurry seal—the proposed runs on an open-graded section were abandoned, as was a series of tests earmarked at Cranfield and Yeovilton.

Principal test pilots involved in the programme were S/Ldr. T. Sheppard (XD248 and XD219), F/Lt. R. Hallem and Lt. M. Hynett, R.N. (both XD248), F/Lt. B. Peaty (XD219), plus F/Lts. D. Goodsir and Gilmore providing occasional support for the testing of XD219.—W. R. Chorley, Fleet Air Arm Specialist (with help from R.A.E. Farnborough).

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Left: Scimitar XD248, the first aircraft to be used in the braking tests. Right: XD219 after its spectacular accident (Photos: R.A.E.)





Register Review

by A. J. JACKSON

Left: McDonnell Douglas DC-9-15, G-BMAA 'Dovedale', first with British Midland company-style registration, landing at Glasgow 2/7 (Andrew Denholm). Right: J.P.D. Hayward's new T-tail Hughes 500D, G-BHWD, competing for the British Helicopter Championship, Sandown Park 21/6 (Cliff Knox)

United Kingdom

Registration	Type	c/n.	Previous Identity	Remarks
G-AVXB	Bensen B-8	PCL.I		Restored to C. Mowat, Evesham
G-AXES	Beagle Pup 2	056		Restored to J. N. Hamilton
G-AXUB	BN-2A Islander	121	5N-AIJ	Restored to Bristol Helicopters Ltd., Redhill
G-BGPH	AA-5B Tiger	1248		Laker Airways Ltd., Gatwick
G-BGXI	DC-10-30	47815		British Caledonian Airways Ltd.
G-BHDI	DC-10-30	47831		E. J. Horsfall, Preston, Lancs.
G-BHEG	Jodel D150	46	PH-ULS	Gail Roy, c/o Colt Balloons Ltd.
G-BHGB	Colt 77A	079		Rogers Aviation Ltd., Cranfield
G-BHHG	Cessna F152	F.1725		St. Aubins Aircraft Ltd., Jersey
G-BHHI	Cessna F152	F.1750		Westair Flying Services Ltd.
G-BHIJ	Bandeirante	270		R. L. Goodwin, Woodstock, Oxon.
G-BHKG	Cessna F172N	F.2024		Denham Flying School Ltd.
G-BHLT	Tiger Moth	911		C.S.E. Aviation Ltd., Oxford
G-BHMF	Cessna FA152	F.0368		D. I. Gray-Fisk, Farnham Common
G-BHMG	Cessna FA152	F.0367		M. G. Jefferies, Sandy, Beds.
G-BHOR	Cherokee 161	28-16331	N82162	C. J. & S. E. Francis, Swansea
G-BHOU	Cameron V-65	657		B. C. Heyward, Tackley, Oxon.
G-BHPL	Jungmeister	148	E3B-350	The Balloon Stable Ltd.
G-BHPS	Jodel D120A	C1/0483	9M-ANA	Express Aviation Services Ltd.
G-BHRD	Chipmunk 22	40112		Mrs. J. M. Bisco & partners, t/a A. J. Organ & Son, d/d Long Marston-Staverton
G-BHRF	AB400 gas balloon	24-0958	N3839H	12/6, f/f in British marks, Staverton 23/7
G-BHRV	Mooney Mk. 20J	93	F-BPCP	Martin Butler Associates, Standon, Herts.
G-BHRW	Robin DR221			W. R. Craddock & Son Ltd., North Hykeham, Lincs.
G-BHRX	Cessna 340A	0115		H. C. G. Munro, The Cotswold Flying Group, Dursley, Glos.
G-BHSB	Cessna 172N	72977	N1225F	R. K. Bastable, t/a Abbey Hill Vehicle Services, Yeovil
G-BHSL	Jungmeister	236		B. A. Mills, Gt. Eversden, Cambs.
G-BHST	Hughes 369D	400714D		Keenair Services Ltd., Speke
G-BHSY	Jodel DR1050	546	F-BLZO	C.S.E. Aviation Ltd., Oxford
G-BHTH	T-6G Harvard	493072A	N2807G	Air Atlantique Ltd., Jersey
G-BHTR	Jet Ranger 206B	3035		B. Giles, Cheshire
G-BHTV	Cessna 310R	1874	N1EU	Lattay Aviation Ltd., Fleet
G-BHUG	Cessna 172N	72985	N1283F	Three Counties Aero Club Ltd., Blackbushe
G-BHUI	Cessna 152	83144	N46932	D. B. Robinson & partners, London
G-BHUJ	Cessna 172N	71932	N5752E	S. G. Towers, Harrogate, Yorks.
G-BHUK	Rutan Quickie	0271		Keenair Services Ltd., Speke
G-BHUM	Tiger Moth	85453	DE457	Brymon Aviation Ltd.
G-BHUW	Boeing Stearman	75-3475		Express Aviation Services Ltd.
G-BHUY	Twin Otter 310	709		Rogers Aviation Ltd., Cranfield
G-BHVB	Cherokee 161	28-16260	N9638N	P. M. Randalls, Dyfed
G-BHVC	Cessna 172RG	0550		Short Bros. Ltd., Belfast; 'VJ' sold in Malawi
G-BHVE	Saffrey S330	SH.1972		
G-BHVJ	Skyvan 3	SH.1973		
G-BHVK	Skyvan 3	SH.1973		
G-BHVL	Shorts SD3-30	SH.3048		Short Bros. Ltd., Belfast, sold to Olympic Airways 5/80
G-BHVM	Cessna 152	81856	N67477	Three Counties Aero Club Ltd., Blackbushe
G-BHVN	Cessna 152	83577	N46803	F. & Sonia Horridge, Lasham
G-BHVR	Cessna 172N	70196		Spooner Aviation Ltd., Shoreham
G-BHVS	Enstrom F-28A	115	N9586	Milton Bradley Ltd., London
G-BHVV	Cessna 414A	0317		Janet Kirk, Taunton
G-BHVX	Piper J3C-65 Cub	10291		Innpack Ltd., Gayhurst, Bucks.
G-BHVZ	Cessna 180	31691	F-BHMU	R. Moore, Preston, Lancs.
G-BHWD	Hughes 369D	689D		J. P. D. Hayward, Little Hasley
G-BHWJ	AA-5A Cheetah	0743	N26823	Cabair Ltd., Elstree
G-BHWN	WMB3 Wind-tracker	6		Wallingford Model Balloon Gp.
G-BHWP	WMB4P Wind-streaker	7		C. J. Dodd, Wallingford, Oxon.
G-BHWR	AA-5B Tiger	1172	N4532L	Cabair Ltd., Elstree
G-BHWS	AA-5A Cheetah	0793	N26892	Rogers Aviation Ltd., Cranfield
G-BHWT	Cessna F152	F1785		Short Bros. Ltd., Belfast
G-BHWU	Shorts SD3-30	SH.3049		Citation Flying Services Ltd. F. Johnson (Westwood Garages)
G-BHWV	Shorts SD3-30	SH.3050		Zitair Flying Club Ltd.
G-BHWV	Shorts SD3-30	SH.3051		British Aerospace; d/d to Botswana ex Prestwick 1/7
G-BHWV	Cessna U206	03573	PH-HER	Commander Jetprop Ltd., Hurn
G-BHWY	Cherokee Arrow	28R-	N56904	Thunder Balloons Ltd.
G-BHWZ	Cherokee 181	28-90299	N3379M	Loganair Ltd., Glasgow
G-BHXA	Bulldog 120	407		Pilatus Britten-Norman Ltd.
G-BHXB	Bulldog 120	408		Bembridge
G-BHXC	Commander 112	13258	N1005C	I. R. F. Hammond, Gosport
G-BHXE	Thunder AX-3	280		J. C. Fitzgerald
G-BHXG	Twin Otter 310	694		C. G. Wrzesien
G-BHXM	BN-2A Islander	2024		P. R. Hing, Barton, Beds.
G-BHXL	Cherokee 140	28-21106		Colt Balloons Ltd.
G-BHXM	Evans VP-1	1		Thunder Balloons Ltd.
G-BHXM	Electra-Flying Eagle	1		Hockstar Ltd., London
G-BHYN	R.V.3	105098		R. K. Haldenby & T. S. Warren
G-BHXT	Colt 12A	89		Bembridge; d/d Calais-Southend-Newbury 16/6
G-BHXR	Thunder AX-7/65	282		M.L.P. Aviation Ltd., Elstree
G-BHXT	Thunder AX-6/56Z	281		Westair Flying Services Ltd.
G-BHXX	Aztec 250	27-5101		C.S.E. Aviation Ltd., Oxford
G-BHXY	Piper J3C-65 Cub	11905	D-EAXY	McAlpine Helicopters Ltd.
G-BHYA	Cessna R182	00532	N1717R	D. Starkey, Amersham, and A. Fraser, Crowthorne, Berks.
G-BHYC	Cessna 172RG	0404	N4868V	Short Bros. Ltd., Belfast
G-BHYE	Cessna 200T	34-70233	N8225U	Affleck Aero Wing Flying Group, Auchinleck, Ayr
G-BHYF	Seneca 200T	34-70234	N8225V	C. Sisson, Eastwood, Notts.
G-BHYG	Seneca 200T	34-70235	N8225X	Executive Wings Ltd., Castle Donington
G-BHYH	AS350B Squirrel	1302		
G-BHYI	Stampe SV-4A	18		
G-BHYJ	Shorts SD3-30	SH.3052		
G-BHYK	Shorts SD3-30	SH.3053		
G-BHYL	Shorts SD3-30	SH.3054		
G-BHYM	Shorts SD3-30	SH.3055		
G-BHYN	Evans VP-2	10571		
G-BHYO	Cameron N-77	659		
G-BHYP	Cessna F172M	F.1108	OY-BFR	
G-BHYR	Cessna F172M	F.0932	OY-DZH	

Left: Topsy Nipper G-AVKK, now registered in Ireland to Brian Carpenter, made its first appearance as EI-BJH at Shannon 7/7. Right: New shapes in European skies—Beech 77 Skippers EI-BHT and 'HU' after assembly at Shannon for Avair Ltd., Dublin (Photos: David O'Mahony)





Two unused pre-1939 registrations issued recently to vintage aircraft restorer C. C. Lovell were for (left) American-built D.H.60M Moth N585M, shown at the P.F.A. Rally, Leicester 5-6/7 as G-AAMY (Ian MacFarlane) and (right) Percival Gull Six HB-OFU which attended the same meeting as G-AERD (Roger Jackson)

G-BHYS	Cherokee 181	28-90319 N8218Y	C.S.E. Aviation Ltd., Oxford	G-ATXW	WHE Airbuggy	M4/2	} Withdrawn from use
G-BHYU	Super King Air 200	BB-756	Eagle Aircraft Services Ltd.	G-AVHC	Brookland Mosquito	5	
G-BHYV	Evans VP-1	1569	L. Chiappi, Clitheroe, Lancs.	G-AVKK	Tipsy Nipper	S.104	} Sold in Ireland as El-BJH
G-BHYW	Jet Ranger 206A	8043	J. Templeton, Orsett, Essex	G-AWIF	Brookland Mosquito	LC.1	
G-BHYX	Cessna 152	81832 N67434	Tradecliff Ltd., Wokingham	G-AXLH	Tipsy Nipper	S.130	} Crashed on test at Hurn 12/5/79
G-BHYY	Cherokee 161	28-16261 N9639N	C.S.E. Aviation Ltd., Oxford	G-AXLX	HS125 Ser. 400B	25199	
G-BHYZ	Cameron V-77	661	Hon. A. G. R. Calder, London	G-AZLD	Cessna 182P	60868	} Sold in Cyprus
G-BHZF	Evans VP-2	10509	D. Silsbury, Ivybridge, Devon	G-AZMW	Twin Comanche	39-54	
G-BHZG	Sonerai II	409	R. A. Gardiner & B. Chapman	G-AZTB	Bolkow 209 Monsun	159	} Crash landed at Sunderland 13/2/80
G-BHZH	Cessna F152	F.1786	Rogers Aviation Ltd., Cranfield	G-BAAS	Cessna FR172E	F.0040	
G-BHZI	Thunder AX-3	287	Thunder Balloons Ltd., London	G-BARJ	Bell 212	30563	} Re-registered in Bermuda
G-BHZJ	Hughes Stratosphere Balloon 150	PHJ150-02	P. J. Hughes	G-BCDE	Sikorsky S-58ET	58-1090	
G-BHZN	AA-5B Tiger	1179	} Cabair Ltd., Elstree	G-BCDG	Sikorsky S-58ET	58-1111	} Re-registered in South Africa
G-BHZO	AA-5A Cheetah	0692		G-BCOW	Sea Fury TT20	ES3615	
G-BGZR	Bulldog 120	409	} British Aerospace Aircraft Group, Prestwick	G-BDMF	Gulfstream II	103	} Sold in the United States
G-BGZP	Bulldog 120	410		G-BEHL	Agusta-Bell Soloy	1575	
G-BGZS	Bulldog 120	411	} S. R. Clarke	G-BEJO	Navajo Chieftain	31-5212	} Sold in the United States
G-BGZT	Bulldog 120	412		G-BEPR	Navajo Chieftain	31-52063	
G-BHZU	Piper J3C-65 Cub	9606	} W. C. Forster	G-BEZO	AA-5 Traveler	0537	} Beyond repair in forced landing at Elstree 6/1/80
G-BHZV	Jodel D120A	278		G-BFHW	DC-8-54F	45879	
G-BHZZ	Air-Britain Manchester Eagle 8	MAN.1	} J. J. T. Cooke, Cheadle, Hulme, Cheshire	G-BFJY	SA330J Puma	1484	} Sold in West Germany
G-BIAA	TB-9 Tampico	141		G-BFLJ	Navajo Chieftain	31-52030	
G-BIAB	TB-9 Tampico	142	} Air Touring Services Ltd., Biggin Hill	G-BFPN	SA330J Puma	1490	} Sold in the United States
G-BIAC	Rallye 235GT	13323		G-BFPW	Dakota 3	T3-40	} Sold in Malaysia
G-BIAI	WMB2	008	} I. Chadwick, West Drayton	G-BGCE	Dakota 3	13378	
G-BIAB	TB-9 Tampico	144		G-BGCF	Dakota 3	T3-33	} Blackbushe-Thruxton 12/6 as N3753N
G-BIAM	TB-10 Tobago	144	} Dukeries Aviation Ltd.	G-BGCG	Dakota 3	T3-37	
G-BIAN	AA-5B Tiger	1050		G-BGFL	Navajo Chieftain	31-52047	} Blackbushe-Thruxton 12/6 as N3752Z
G-BIAP	PA-16 Clipper	16-732	} Jabrest Ltd., London, SW19	G-BGOK	Cameron D-96	469	
G-BIAR	Rigg Skyliner II	IAR-02		G-BGWL	Sikorsky S-61N	61821	} Sold in the United States
G-BIAR	toy balloon		} Crashed in the Alps 2/8/79	G-BHCV	Cameron A-140	561	
G-BIAR	toy balloon				airship		} Sold in Canada
G-WAGY	Cessna F172	F.2008	} I. M. Callier & P. J. Bish				
G-WARM	Jet Ranger 206L	45347					} Sold in Kenya
G-WOLF	Cherokee 140	28-25439 OY-TOD	} I. A. Rigg				
G-WOLF	Cherokee 140	28-25439 OY-TOD					
G-WPUI	Cessna P172D	57173	} J. B. Wagstaff, Leicester				
G-WPUI	Cessna P172D	57173					
G-YIII	Cessna F150L	F.0827	} Warmco (Manchester) Ltd.				
G-YKIV	Cessna F150K	F.0825					
G-ZEAL	Learjet 35A	275	} Citation Flying Services Ltd., Humberside, d/d via Southend 2/4				
G-ZIPP	Cessna 310Q	0738					
G-ZIPP	Cessna 310Q	0738	} Oldham & Crodder (Promotions) Ltd.				
G-ZIPP	Cessna 310Q	0738					
G-ZIPP	Cessna 310Q	0738	} Citation Flying Services Ltd., Humberside, d/d via Southend 9/6				
G-ZIPP	Cessna 310Q	0738					
G-ZIPP	Cessna 310Q	0738	} Jointair Ltd., operated by Fairflight Charters Ltd.				
G-ZIPP	Cessna 310Q	0738					
G-ZIPP	Cessna 310Q	0738	} Citation Flying Services Ltd., Humberside, d/d via Southend 10/7				
G-ZIPP	Cessna 310Q	0738					
G-ZIPP	Cessna 310Q	0738					

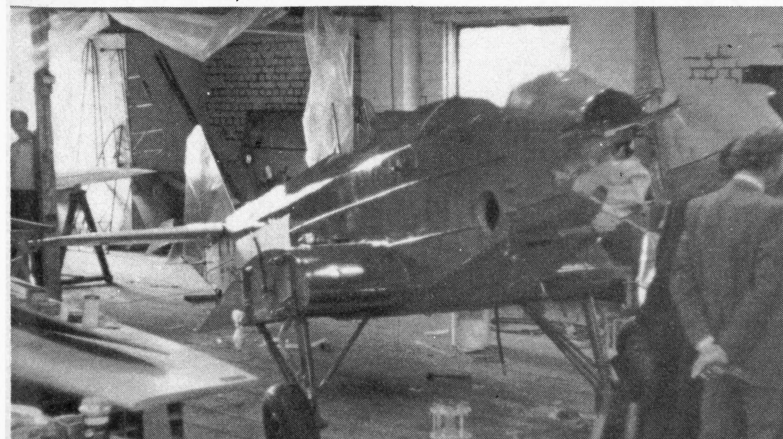
REGISTRATIONS CANCELLED

Registration	Type	Identity	Reason
G-AROI	Dove 5	04474	Sold in Denmark, became N25GM
G-ASDI	Apache 160	23-2046	Aircraft destroyed
G-ASSM	HS125 Ser. 1/522	25010	Sold in Nigeria
G-ATUJ	Beagle 206	029	Sold in the United States

PRODUCTION LINE

...Cessna F152 G-BHUP, d/d Reims-Southend-Squires Gate for Westair 9/7
 ...Cessna T188 N2033J, rolled out in UK marks as G-BHTD, Southend 12/6
 ...Commander 114 (14161) AN-BRL, d/d to Southend 7/6 to become G-BHSE
 ...HS125 Series 700A (257095; NA0267) N125L, Duncan Aviation; (096/0271)
 G-5-14/XA-KEW, SARSA; (098/0269) G-5-15/N125Y, Poco Productions; (099/0270)
 G-5-16, Daon Developments
 ...HS748 Series 2A (1769) 6V-AEO, Royal Senegal; (1770) G-BGPR, to Transkei Airways as ZS-XGE; (1771) 9N-ABR, Royal Nepal Airlines; (1772) 5R-MJA, Air Madagascar; (1774) G-11-12, Woodford-Prestwick 26/5 for completion; (1775) G-11-13 on 6/6; (1776) G-11-14 to follow
 ...Islander (568) RP-2165; (569) RP-C2166; (589) S7-AAD, d/d to Seychelles Police 27/5; (593) G-BENW, to the Philippines as RP-C2168; (594) G-BENX, to RP-2159(2); (595) G-BENY, first sold as 9V-BJN, now PK-VIT; (832) G-BEMH, now Air Tuganar VY-EER; (837) G-BEMO, now Indonesian Aviation Corp. PK-BIG; (854) G-BEWW, now Magnum Airlines ZS-KMD; (856) G-BEVE, d/d 23/2/80, became JA-5265
 ...Jungmeister (541) G-OBLE, d/d Le Touquet-Southend-Elstree 10/7
 ...Tiger Moths on overhaul at Shipdham include (82018) VT-CZV, ex G-AISY; VT-DOW; VT-DOY to 'PB inclusive; and VT-DPH
 ...M.S.733 Alcyon (125) F-BMQJ, d/d Le Touquet-Southend-Sutton Bridge 14/6 to become G-SHOW
 ...Tobago G-EWBJ, d/d to Biggin Hill 6/80
 ...Trislander (321) G-AZZM, to Tavina ex-Glasgow 11/7 as HK-2481

Old timers to appear shortly with vintage registrations are (left) the South Wales Swallow Group's B.A. Swallow 2, G-AFGD, nearing completion at Newport (Geoffrey Jones) and (right) P. A. Mann's Arrow Sport G-AARO, ex N9325, waiting final erection at Biggin Hill (Don Conway)





Airport Movements

Inverness/Dalross

25/6 G-BGOE Beech 76 Duchess, from Aberdeen, first visit of type
3/7 OY-MBB Beech King Air C90, Maersk Air, from and to Copenhagen
4/7 OE-9027 Scheibe SF-25B and OE-9141, SF-25C, Edinburgh-Kirkwall
20/7 G-BDKS Pitts S-2A, Rothmans, with 'ADY', 'ECM', 'ADW' and 'GSD'
New residents: G-BHJO, Piper Warrior II and G-PARI, Cessna 172RG

Glasgow

27/6 N1544X PA34 Seneca; N41ISP Learjet 24 19/7; N62K Jetstar 22/7
28/6 YR-TPJ TUI54B, Tarom; CCCP 85375 of Aeroflot 5/7; '372 19/7
16/7 No. 32 Falcon 10, Aeronavale, c/s F-YETL, from Lann to Biaoue
24/7 TI-SAC CASA 212, new aircraft, from Seville en route Costa Rica

Prestwick

1/6 N99WH Westwind, delivery to U.S.A.; N1124U 7/6; N146BF 17/6
6/6 OE-EWG Air Tractor AT400, with 'MP and 'YP, Reykjavik-Luton
20/6 N169RV NAMC YS-11, ex TR-KLB, Reeve Aleutian Airways, delivery
2/7 92577 B-52G, U.S.A.F., low overshoot, also at Glasgow same day
9/7 N99055 CASA 352 (Ju 52), westbound for Confederate Air Force
19/7 N126JM CASA 212, new aircraft, ferry flight, Seville-Reykjavik
21/7 N1288 Boeing 737-2A6, c/n. 20195, Essex International Wire Co.

Teesside

28/6 PH-MAT F.28 and PH-MAX, DC-9-32, Martinair, Dan Air flights
30/6 G-BGDE Boeing 737-236, British, crew training, f & t Prestwick
5/7 XX113 Jaguar GR.1, coded 09, with XX766:24, both 226 OCU
P7350 Spitfire, for Redcar display; XN508 Jet Provost 21/7
20/7 LZ-BET Il-18D, Balkan, c/n. 8904; XZ336 Gazelle AH.1 on 21/7

Newcastle

2/7 XM649 Vulcan B.2, 101 Squadron, f & t Waddington; XL392 on 24/7
6/7 G-BMAC DC-9-15, British Midland, ex N1058T, JEA Jersey service
7/7 G-POST Beairante, Air Ecosse, new service Shannon-Aberdeen
10/7 OY-HBJ S-61N, Greenlandair, Billund-Shannon; WL756 Shackleton
15/7 XT874 Phantom FG.1, 111 Squadron, f & t Leuchars; OO-LFA Learjet
18/7 77-193 A-10A, U.S.A.F. 81st TFW, emergency landing on one engine
23/7 71438 KC-135A, U.S.A.F. f & t Mildenhall; XX181 Hawk f & t Valley

Leeds and Bradford

27/6 EI-BIV Bellanca Super Decathlon, Dublin-Sherburn, first visit
30/6 OY-BTR Super King Air, c/n. BB-211, Cimber Air, f & t Sonderborg
6/7 N26451 Cessna 310R, c/n. 1818, Cessna; OY-BKS Cherokee on 7/7
7/7 I59363 CT-39G Sabreliner, U.S. Navy, coded JM:12, VR-24 Squadron
11/7 JY-DCA Islander, ex G-BFCN, Royal Falcons, from Biggin Hill to New-
castle and Strathallan with Pitts JY-RJG, 'JH and 'JJ
15/7 N8805K Cessna 340A, c/n. 0987, Sime Darby Plantations, Malaysia,
delivery flight, Reykjavik-Nice; D-GEVI Cessna 337D
26/7 N7549K Cessna P210N, c/n. 0408; N2683F, Cessna 404, c/n. 0604
28/7 HB-GGX King Air F90, c/n. LA-15, Speno Corporation, from Geneva

Blackpool

29/6 XZ178 Lynx, first visit of type; XZ247 4/7; XX399 Gazelle 30/6
28/7 OY-APP Cessna Citation, F-BLLR Beech-SFERMA 60A Marquis on 23/7

Manchester International

24/6 G-BFDR Duke, from Cardiff, new resident, replaces PA31 G-BFAM
29/6 G-OAMH Agusta A.109A, to collect heart for Harefield transplant
1/7 HZ-HM5 L.382G Hercules, Saudi Royal flight, from U.S.A., also HZ-HM6
from Lyneham. Both left on delivery to Jeddah 2/7
2/7 G-BEDF Boeing B-17G, with Elliot Gould, publicising the film "The last
voyage of the Noah's Ark", the latter being a B-29. Visited
Leeds 1/7, Birmingham 2/7, Cardiff 3/7
6/7 F-GCSL Boeing 737-222, ex N9028U, Air Berlin, TAP sub-charter

Left: One of a growing number of Falcon 50s to be seen in the U.K. No.5 of the French Air Force's VIP Flight, based at Villacoublay, was photographed at Heathrow by R. Kunert. Right: Ageing HS 125 Series 1A N413GH, c/n. 25030 ex G-ATBA, of CACI Inc., Washington, visited Heathrow and Dublin on 25/6 as well as Leeds and Bradford where Colin Addison took this picture

7/7 EI-BEU
18/7 ZK-NZR
25/7 G-OJEA

Auster J-4, c/n. 2069, ex G-AIIM, from Barton to Dublin
DC-10-30, Air New Zealand/British, Montreal to Heathrow
Twin Otter, JEA, c/n. 699, delivery Reykjavik to Jersey

Birmingham

22/6 D-AHLL Boeing 727-81, c/n. 18823, Hapag Lloyd, JAT sub-charter
27/6 I-MABU Learjet 24D, c/n. 287, Milan-Manchester; OO-LFA on 7/7
28/6 N880F Dassault Falcon 50, Zurich-Quebec, visited Heathrow 1/7
13/7 N40AS BAC111, from Gander to Dusseldorf; OY-POE Cessna 182P
14/7 EC-CBD Boeing 727-256, Iberia, also 'CAJ' and 'CFE', charters
17/7 N7000C Grumman Gulfstream II, Cargill Inc., to Southend 19/7

Norwich

17/7 D-BOOM Fairchild F-27J, c/n. 0115, ex N2704J, DAL Mobilien
19/7 D-IAPE PA31T Cheyenne; G-BREF, Cessna 421; D-GAHB PA30 22/7
G-APWE Dart Herald 201, Air UK, for repairs and overhaul. It landed on
foam with port gear retracted, Manston 13/5
20/7 G-BHHA Bandeirante, Loganair, with Lee Trevino and others
22/7 G-BHMX Friendship, d/d to Air UK; N1667H PA28, to Cologne

London/Heathrow

21/6 N600CS Boeing 707-312B, Coastal States Gas Corp. First visit
24/6 G-BVVR DHC-6 Twin Otter, Brymon, with G-BGZP, in lieu of Herald
27/6 F-GCDF Fairchild FH27B, T.A.T., Air France flight; 'FC 30/6
1/7 I-BUSD A300B4 Airbus, Alitalia, first service; 'SC 2/7; 'SB 7/7
2/7 N133TW Boeing 747-156, TWA, ex EC-BRO; EC-BRO Boeing 747-256B
4/7 I-ALEC Douglas DC-8-54F, Aeral, c/n. 45682, ex I-DIWL series 40
4/7 G-HHOI HS 125-700B, Trust House Forte, new resident, ex G-BHTJ
11/7 HZ-HM4 Boeing 737-268, Saudi Royal Flight, in Saudia colours

Biggin Hill

10/7 3A-MSX Bell 206L Long Ranger; D-HOGA Jet Ranger c/n. 2657 12/7
13/7 HZ-AO3 Dassault Falcon 50, with guests of the Essex racing team
D-BAKA F-27 Friendship 100, WDL, with D-BAKI; D-ICFB Merlin IV
All the above were in connection with the British Grand Prix, Brands Hatch

Northolt

30/6 I60050 Douglas C-9B, "Spirit of America", St. Johns-Frankfurt
7/7 RS-05 Sea King 48, Belgian Air Force; 70-80, UH-1D, Luftwaffe
MM61923 DC-6, coded 31:8, Italian A.F.; 152687, VC-118B, U.S. Navy
15/7 XX367 Britannia 312, RAE, ex G-AOVM and EC-BSY, also 24-25/7
17/7 I52786 C-2A Gryehound, U.S.N., coded JM/32; 160289, P-3C-I Orion
24/7 6801 C-130H Hercules, Portuguese Air Force, left next day

Southend

2/7 LN-SUP Boeing 737-205, Braathens, f & t Oslo; XX172 HS Hawk T.1
4/7 G-BEPS Belfast, TAC Heavy Lift's 2nd aircraft, d/d to Stansted
27/7 OH-MOD Mooney M.20C, c/n. 2803, Malmo-Stapleford for U.K. reg'n
16/7 N3753V Merlin IV, Cologne-Fairoaks, from U.S.A. via Prestwick 24/6
17/7 HB-VFZ Learjet 35A, Transair; HB-VGF HS 125-700B, Bosch on 28/7
22/7 NI42AL Bell 212, Heli. Hire, from Heathrow in crate, f/f 23/7

Manston

19/6 610286 Boeing EC-135H, U.S.A.F. 10ACCS; N791TW Boeing 707-331C
7/7 Wessex HCC.4, Queen's Flight, with H.R.H. the Queen Mother
22/6 XV732 Douglas DC-3, Royal Danish A.F.; OE-LDA DC-9-32, on 1/7
25/6 K-681 Learjet 24D; 68-15002 and 68-15865, CH-47A Chinooks 10/7
6/7 F-BVEC

Gloucester/Cheltenham (Staverton)

4/7 D-IHKK King Air, Hamburg-Milan; D-ICIM, Baron, f & t Munich 5/7
18/7 PH-TAX PA31T Cheyenne, Amsterdam-Biggin Hill, at Southend 14/7
20/7 NI344 Ryan PT-22, Hurn-Halfpenny Green; G-FILM Alouette 21/7

Left: Now sporting full "Barratt" colours Agusta A.109 Hirundo G-HELY called at Leeds and Bradford on 21/6 (Colin Addison). Right: Recently resurrected for the film "The Eye of the Needle" Helicopter Hire's Westland Widgeon G-ANLW carries the serial MD497 and code X:NE. It ventured as far north as Newcastle and Glasgow on 18/6 but is shown here at its Southend base on 26/7 (Roger Jackson)



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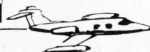
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(Continued on page 372)

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Aviation Bookshelf . . . (continued from page 364)

The author is described as "of Lincoln's Inn, Barrister, Airline Captain" and he should know both sides of the problems. To quote the publisher's description, "This book examines the legal problems that are likely to be encountered by air pilots and their crews. It explains and emphasises the tremendous responsibilities that pilots must bear, and sets out their rights and obligations. . . ."

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It is a fascinating and useful book, even to non-crew members, but space only allows one example of problems facing a crew. Thus we find that giving first aid to a passenger can be a legal nightmare. Some items carried in first aid and survival kits on aircraft contain potent drugs which can do more harm than good and use of these drugs by medically unqualified crews could land them in serious legal trouble.—J.S.

United States Naval Fighters of World War II in Action

by Michael O'Leary (Blandford, £6.95)
The production of this book must have been a labour of love for its author, whose interest in the subject is reflected in the wealth of true action photographs to be found within its covers, many of which have been unearthed from archive sources.

The text strikes a happy medium in its description of operations in the Pacific theatre, the aircraft and, last but

not least, the men that flew them. It is perhaps in the sections devoted to the latter that the author tends to lapse into a style that may, to some, seem reminiscent of paperback accounts of flying exploits.

Some journalistic licence has been granted with the inclusion of the Bearcat as this famous Grumman design saw no active service in W.W.II. Nevertheless, the other types that are included in this volume are each exhaustively described in conjunction with the photographs so painstakingly retained for posterity—perhaps none more so than the picture of a Corsair rocket strike taken by an intrepid reporter from inside a converted U.S.A.A.F. Lightning droptank!—P.A.T.

Aerodata International No. 7 & No. 8—Handley Page Halifax (Merlin-engined Variants) & Boeing B-17G Flying Fortress

by Philip J. R. Moyes (Vintage Aviation Publications, £1.95 each)

Many of the monographs now on the market are angled particularly towards plastic modellers and such is the case with these two. It is probably no coincidence that they appear roughly at the same time as the "Matchbox" models of these types.

Philip Moyes has long been an acknowledged authority on bombers—the Halifax in particular—and these books reflect this. To compress into this small compass the full story of the B-17G is an exercise in writing but in spite of such difficulties the text in both books is accurate and informative. Photographs are good with many "new" ones balanced with old ones

particularly chosen for detail or marking information. There are four pages of 1/72nd-scale drawings of each type, showing basic details and all the many modifications, by Alfred Grainger and two pages of colour tone drawings for marking information.—J.D.R.R.

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As mentioned by Herbert Mettam in his article in this issue, Avro's were building Cierva C.30A autogyros in the mid-1930s. One of these machines, supplied originally to the R.A.F. as Avro 671 Rota K4232 and later flown in Sweden as SE-AZB, has been completely rebuilt by R.A.F. Museum staff at Cardington, repainted in pre-war silver with its original serial, and will soon be on display at Hendon (Photo: John Chapman)



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